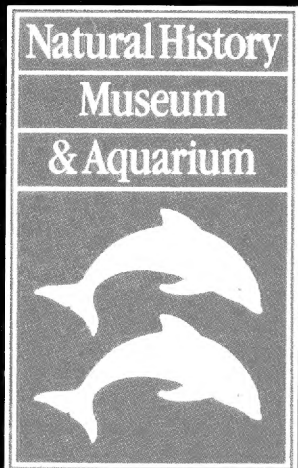
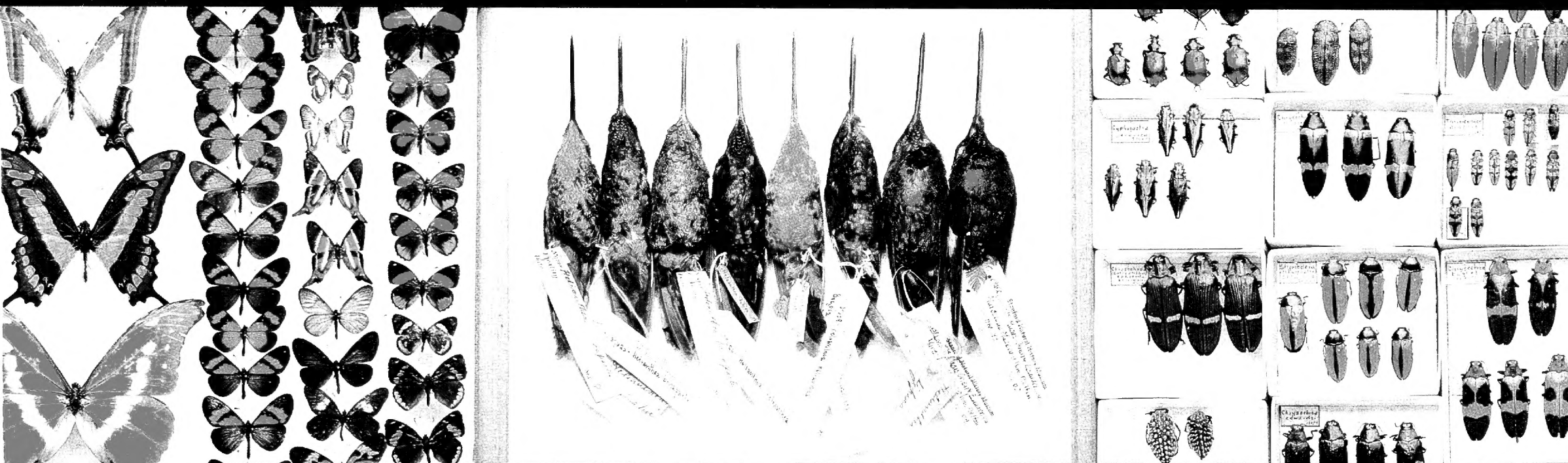


CALIFORNIA ACADEMY OF SCIENCES



1983-1984
ANNUAL REPORT



CALIFORNIA ACADEMY OF SCIENCES

Golden Gate Park, San Francisco, California 94118

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MESSAGE FROM THE CHAIRMAN



THE FISCAL YEAR 1983-84 was another active and successful year for the California Academy of Sciences, the result of the combined commitment of the Academy's staff and its corps of volunteers. It is not widely realized the many departments of the natural history museum and aquarium have more than three times as many volunteers as they have staff. Our volunteers now number nearly 700 persons, and they contribute significantly in the operation of every part of the institution: in the eight science departments; in the library and Picture Collection; at the information desk in Cowell Hall; in the aquarium feeding animals and cleaning tanks; at Bay Area schools with the Supervan; in the exhibit halls leading docent tours; and in the membership office helping keep track of our growing membership. These volunteers strengthen the Academy in its educational and scientific role and help make the museum and aquarium more enjoyable and informative to visitors.

The institution's vigorous programs also derive strength from the support of thousands of donors, both large and small. During the year, the total amount of gifts to the Academy increased 40 percent over the previous year—making 1983-84 a banner year. (See pages 38 through 40 for a complete list of the generous individuals, corporations, and foundations that help support the institution.) Of particular note is the fact that corporate giving during the year rose to a record of \$173,224, a 95 percent increase over 1982-83.

Concern and interest on the part of San Francisco's mayor, the Hon. Dianne Feinstein, as well as from the San Francisco Board of Supervisors, resulted in increased financial support from the city, which helped with several long-term deferred maintenance projects.

Within the Academy's own board of trustees, Dr. Bruce A. Bolt was re-elected president, and Dr. James C. Kelley remained vice president. Under their guidance, the Science Council strengthened the involvement of the Academy's 300 distinguished fellows, aided by the Fellows' Committee and by its chairman Dr. John S. Hensill. Together they sponsored a fellows' symposium on the origins of bird flight, the first in a regular series of fellows' symposia.

We were joined during the year by Dr. Jane Goodall, who has been appointed Curator of Primatology. We are delighted that this outstanding and intrepid scholar has joined the staff.

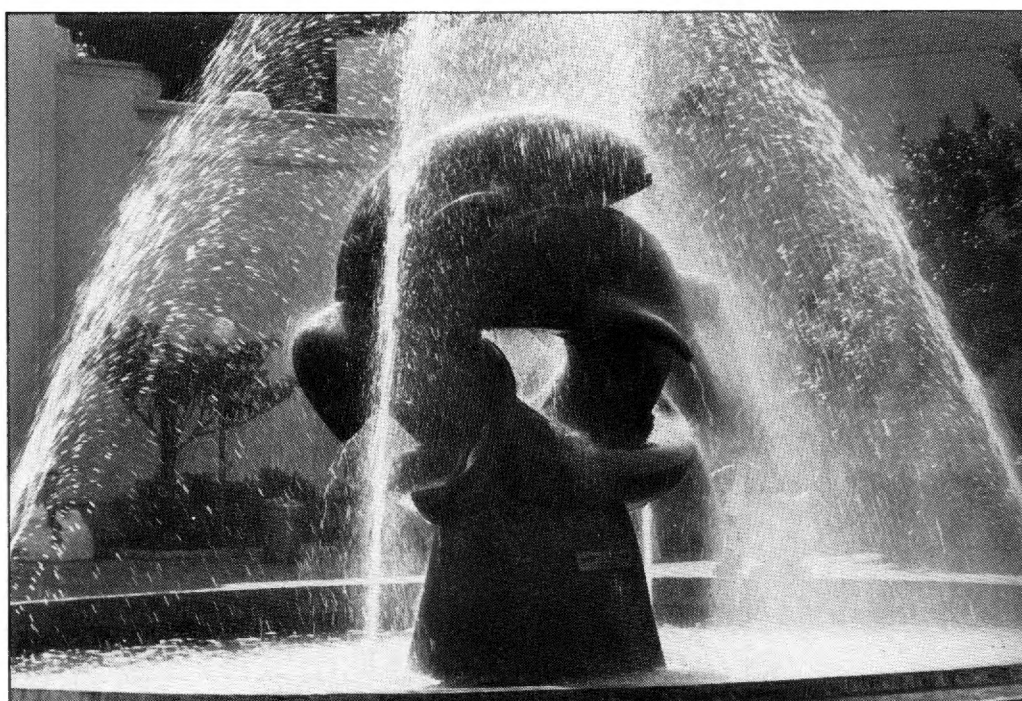
The year also brought sadness, however, with the deaths of several people important to the Academy and its staff: Dr. A. Starker Leopold, a long-time trustee and friend; Dr. Richard H. Jahns, also a trustee of long standing; Dr. Robert C. Miller, director of the Academy through the 1940s and 1950s; and Geraldine Lindsay, former trustee and beloved wife of Director Emeritus George E. Lindsay. We are deeply saddened by their loss but heartened by the examples they set; their selfless dedication remains our inspiration.

Plans for improvements to the Natural History Museum and Aquarium continue with full participation by members of the board of trustees. The California Academy of Sciences is positioning itself for major new activities in the coming years.

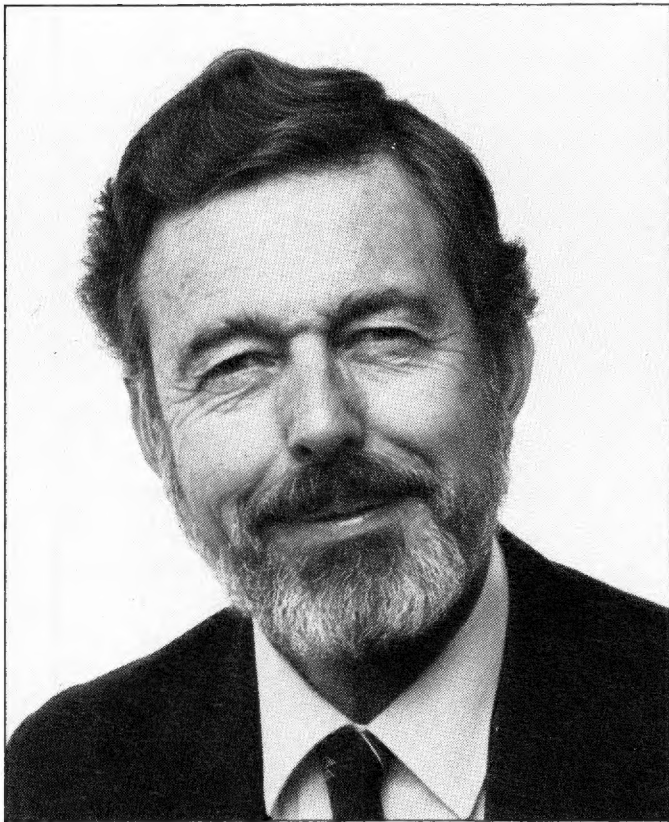
A stylized, cursive signature of Rudolph A. Peterson in dark ink.

Mr. Rudolph A. Peterson
Chairman of the Board of Trustees

The Academy's whale sculpture and fountain, by artist Robert Howard, is a popular attraction in the Natural History Museum and Aquarium's central courtyard. [Photo by Lloyd Ullberg.]



DIRECTOR'S REPORT



NOW IN ITS THIRTEENTH DECADE of scientific and educational service, the California Academy of Sciences has had an extremely productive year. This report documents all of the activities of the Natural History Museum and Aquarium's departments over the fiscal year 1983-84; however, several highlights deserve special mention:

- One million four hundred and seventy thousand visitors viewed the institution's exhibits during the year—an increase over the previous year and a reversal of a five-year downward trend.
- Planning and/or construction began on three major permanent exhibit halls: Edward Hohfeld Hall of Earth and Space Science, open in October 1984; Meyer North American Hall renovation planned to begin in 1985; and Peterson-McBean Hall of Life Through Time, also to open in 1985.

- Ten temporary exhibits were displayed including *The Art of Robert Bateman*, lovely and detailed wildlife paintings of this Canadian artist; *Andy Warhol: Endangered Species*; and *Amber*, an exhibit of fossil amber—among many others.

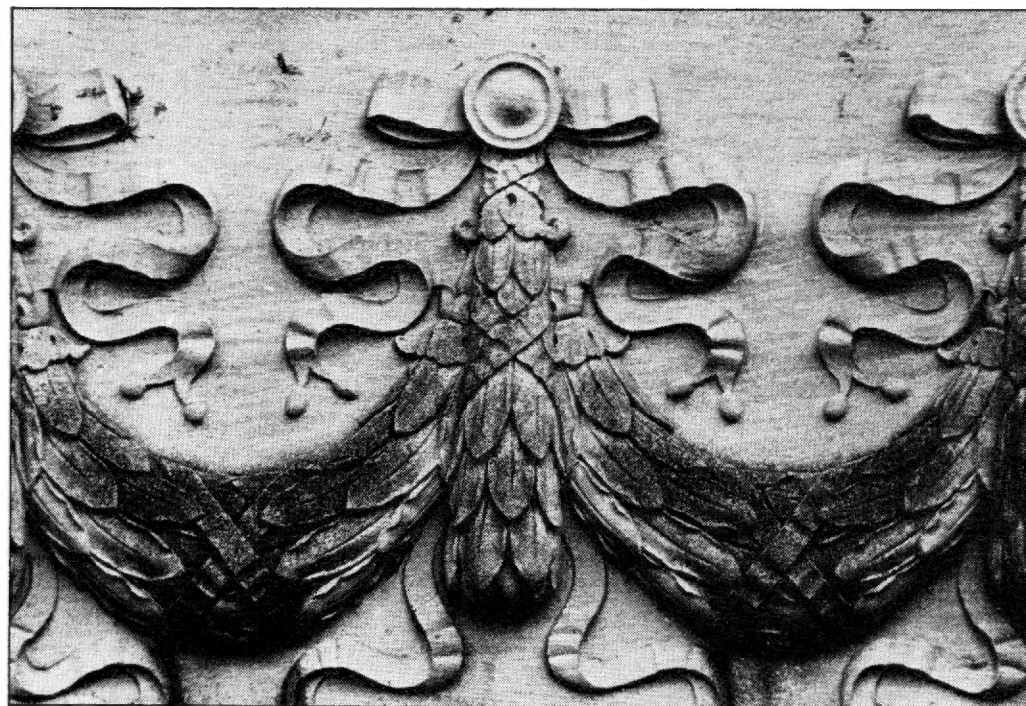
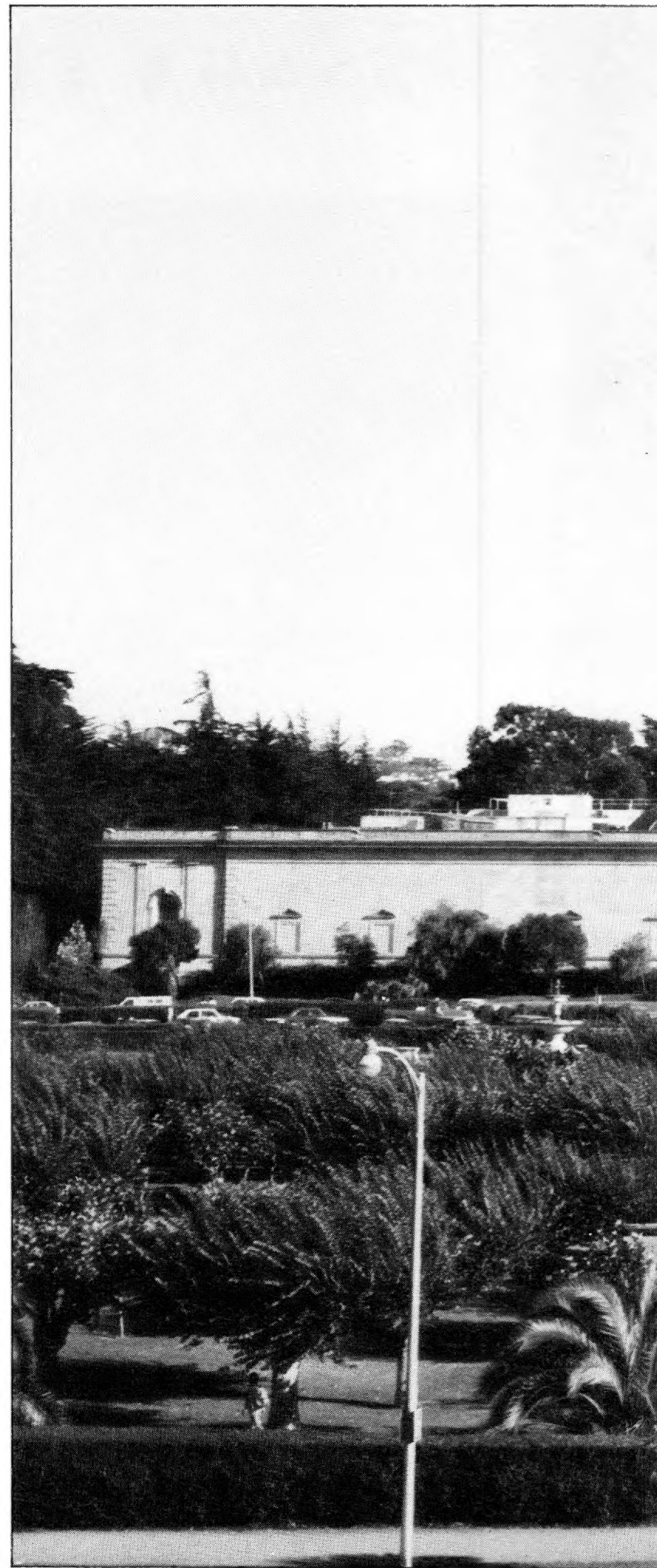
- Education for youngsters increased in scope, with more than 76,000 children taking advantage of Academy programs such as docent tours, Supervan visits to schools, field trips, Junior Academy courses, and Discovery Room adventures.

- Staff scientists furthered their research work in Africa, China, South America, Australia, Turkey, Canada, and the Pacific Islands, generating large and valuable collections of specimens, solving problems in plant and animal classification, and publishing new species descriptions.

- Staff continued to serve public agencies and private corporations in research efforts. For example, aquarium staff helped Chevron Corporation design an environmentally sound solution to a problem in an oil exploration project.

The California Academy of Sciences has been able to keep its lively image and to increase its activity this year through the hard work of a dedicated and imaginative staff collaborating with a great force of volunteers. We are also deeply grateful to our many benefactors for their continuing help in our efforts. I am proud to be working with all of them.

Dr. Frank H. Talbot
Executive Director





Above, the Natural History Museum and Aquarium complex in Golden Gate Park, photographed from atop the de Young Museum.

At left, architectural motifs decorate the Academy's historic facade.

[All photographs on the following pages and throughout this book were taken by Academy Photographer Susan Middleton, unless otherwise captioned.]

AQUARIUM

John E. McCosker, *Director*

THE STEINHART AQUARIUM, which opened in 1923, is the oldest American institution of its size and is renowned among aquariums of the world because of its commitment to the use of aquatic animals for research and public display. Although staffed and managed by the Academy, the Aquarium is a city department, and the city and county of San Francisco are mandated by charter to support its "maintenance, operation, and continuance." All improvements, such as the Fish Roundabout, are privately funded, and, increasingly, operational support has come from Academy sources. Corporate and public generosity have kept us afloat, however, allowing more than 100 million visitors to enjoy our aquatic displays during the last six decades. The Aquarium staff look forward to further enhancing its underwater world in the decades to come.

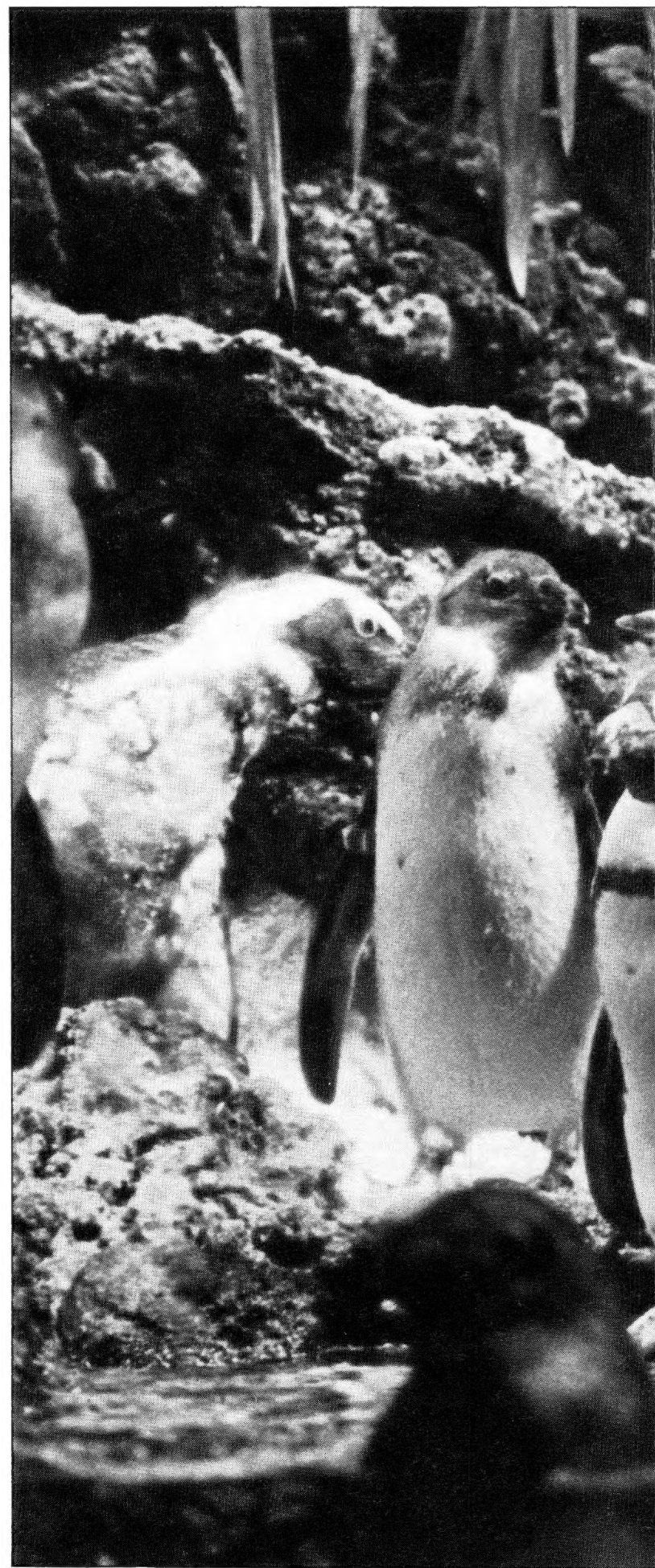
Penguins dominated the Aquarium environment this year, fascinating viewers and keeping the staff hopping. Improvements made possible by Lester Gunther, Sr., and a covey of penguin adoptors include a new sound system in the public area and a viewing platform that allows improved access to both the penguins and dolphins. The young colony spent little time in acclimating to their new home and soon began courtship behavior. The successful hatching of a chick followed. Although the chick lived only eighty days (extraordinary for first time penguin parents), it portended a successful future breeding program for this endangered species.

Other renovations and improvements to the Aquarium were accomplished by the engineers, fabricators, and biologists. An anonymous donor made the carpeting of the Fish Roundabout possible, and paint donated by Richard Levine and family was applied both inside and outside of our many displays. Unseen by the public, the engineering staff labored hard at their normal duties as well as the additional installation of a new public address system, air compressors, boiler systems, and a new electrical system to our Great Highway salt-water supply plant. Construction was begun by Bill Rohrs and Jim Derzon on a

Monterey habitat display, which will allow an underwater view of our rich California coastline. The aging dolphin and seal display was given a partial facelift and window resealing, supported in part by the generosity of Academy members.

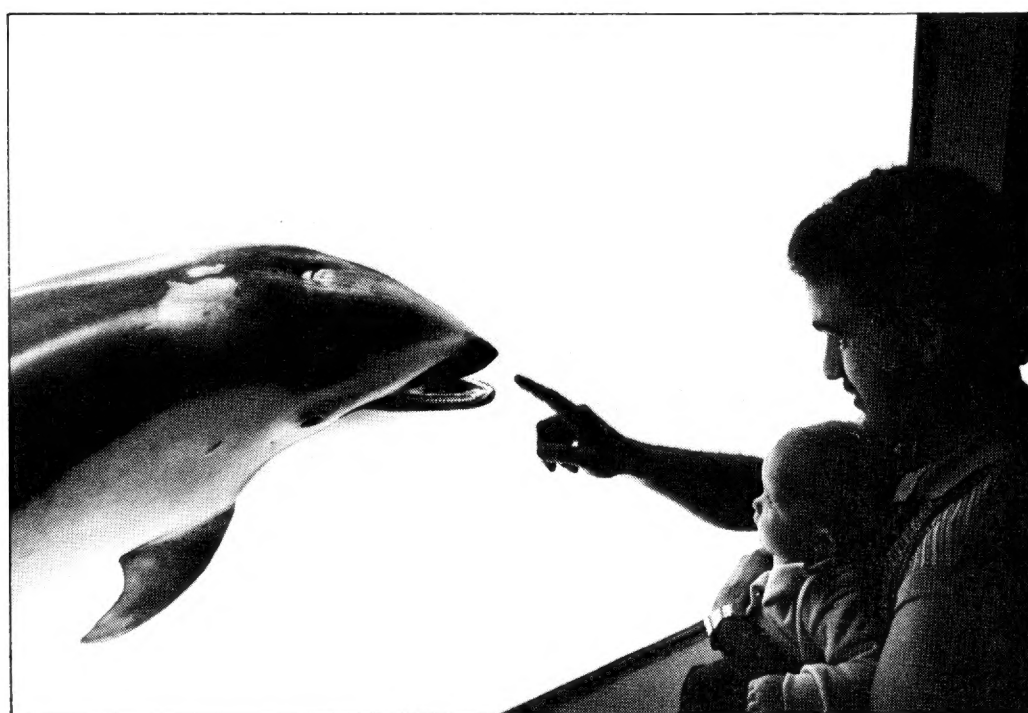
Staff ventured near and far to collect specimens for display and research. Bruce Hiler and Jonathan Mee spent their vacations in highland Costa Rica collecting frogs and studying rainforest ecology. Robert and Lynn Dunne and their diving associates returned with specimens from Baja California. John McCosker and John Hewitt joined Research Associate Al Giddings and film crews from the BBC and KGO television aboard Meatball Williams's *Buccaneer* to film and study great white sharks at the Farallon Islands, and returned with several rare fishes. Assisted by the Academy research staff, the Aquarium graduated twenty-five docents and twenty-two auditors in a fact-filled, exhaustive but thoroughly enjoyable, twenty-one week program. Staff presented lectures and attended and spoke at several conferences, including Tom Tucker and John Hewitt (American Association of Zoological Parks and Aquariums) and Yaye Herman (American Society for Microbiology). John McCosker lectured at American universities and museums, appeared on several television programs, and wrote and narrated a BBC television special entitled "Jaws: The True Story."

Substantial supplemental funding to the charter-required Aquarium support was provided by many individuals, including Mr. Foster Bam, Mrs. Marriner Eccles, Mr. and Mrs. Jeffery Meyer, Mr. Carlton Colombat, Mr. George Lang, KGO Television, BBC Television, Chevron U.S.A., Inc., and many other generous individuals and corporations.





Above, Christina Slager offers a fish to a shy black-footed penguin in the Aquarium's Penguin Environment. [Photo by Ken Browning.]



At left, visitors get a close-up look at one of the Aquarium's Pacific white-sided dolphins.

Far left, members of the Aquarium's skilled engineering staff (left to right): Jamie Padover, Ted Steffens, George Kobut, Frank Bezek, Mike Barrow, and Lane Chrisman.

PUBLIC PROGRAMS

Eugene F. Behlen, *Director of Public Programs*

FOR PUBLIC PROGRAMS the year 1983-84 represented an important formative period. We strove to establish a strong identity for the department of Education under Sue Douglas, and the Department now functions in a unified way. The price of growth is more organization, and in this case it appears to be stimulating health also.

The Photography department has been consolidated and is under Susan Middleton's expert guidance—a tough job to manage because she must balance scientific researchers' needs as well as those of Development, Public Information, and Exhibits. Susan's work keeps us aware of her ability to produce high-quality photography.

Under Steven Craig's direction, the Morrison Planetarium prospers. The quality of the star shows is very high and the scholarship is excellent. The public has responded with higher attendance than ever before. Technical upgrading of the equipment is a major challenge for the staff.

The Exhibits department has produced temporary exhibits that have increased our attendance and added strength in variety and interest for our visitors. Last year improvements in the African Hall proved so successful that we have begun a continuing program to upgrade the major permanent galleries. Science Hall, open in the fall, is the second in the series, to be followed by North American Hall. The new department chairman, Robert Kosturak, is planning major work in North American Hall. The department's reorganization will better serve the major work in the immediate and distant future.

In fact, all departments of the Public Programs division are looking forward with excitement to the "Campaign for Excellence" and the new major projects it will bring into reality.

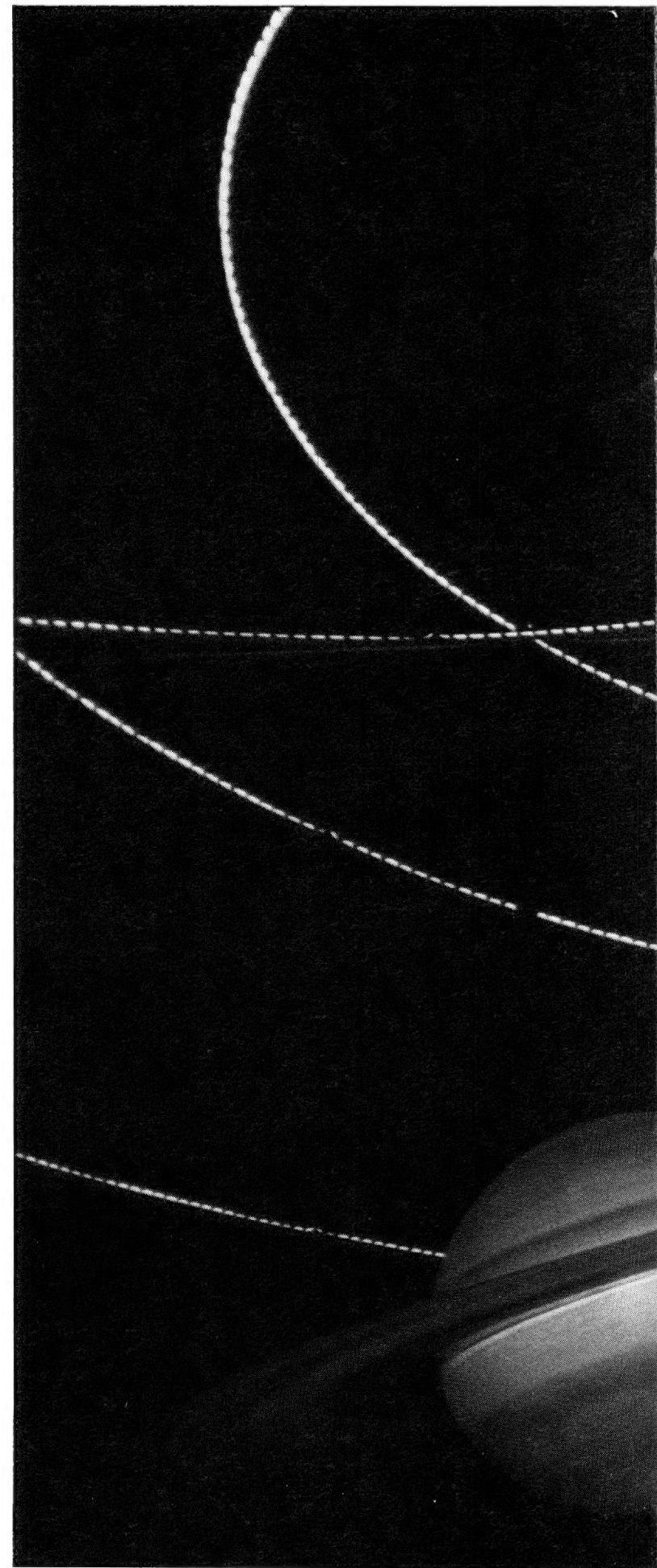
PLANETARIUM

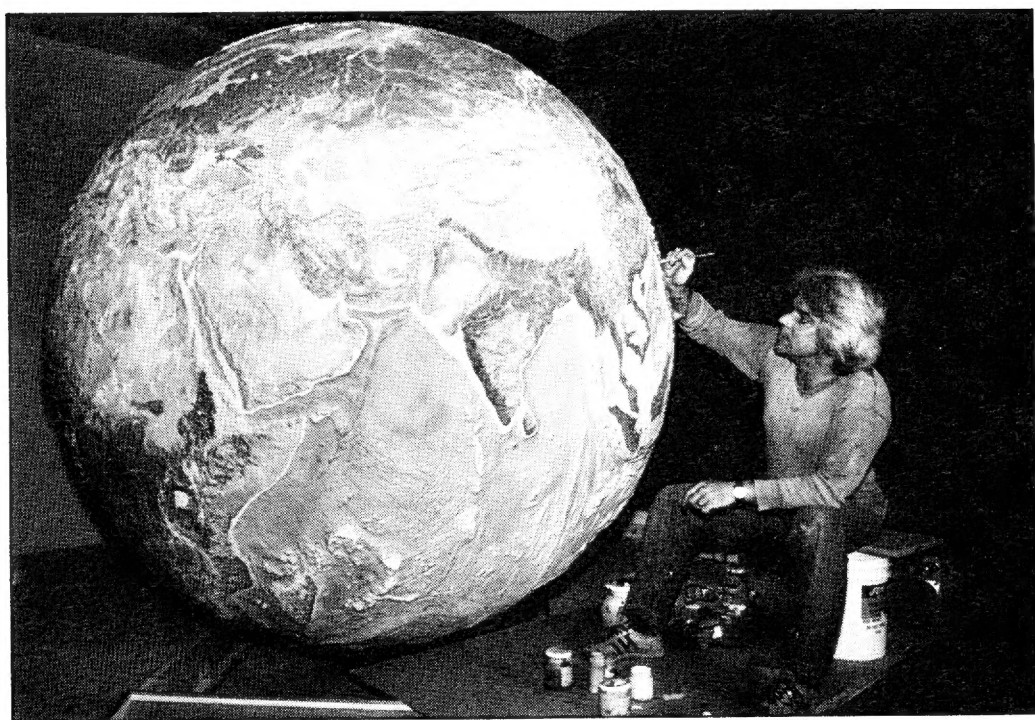
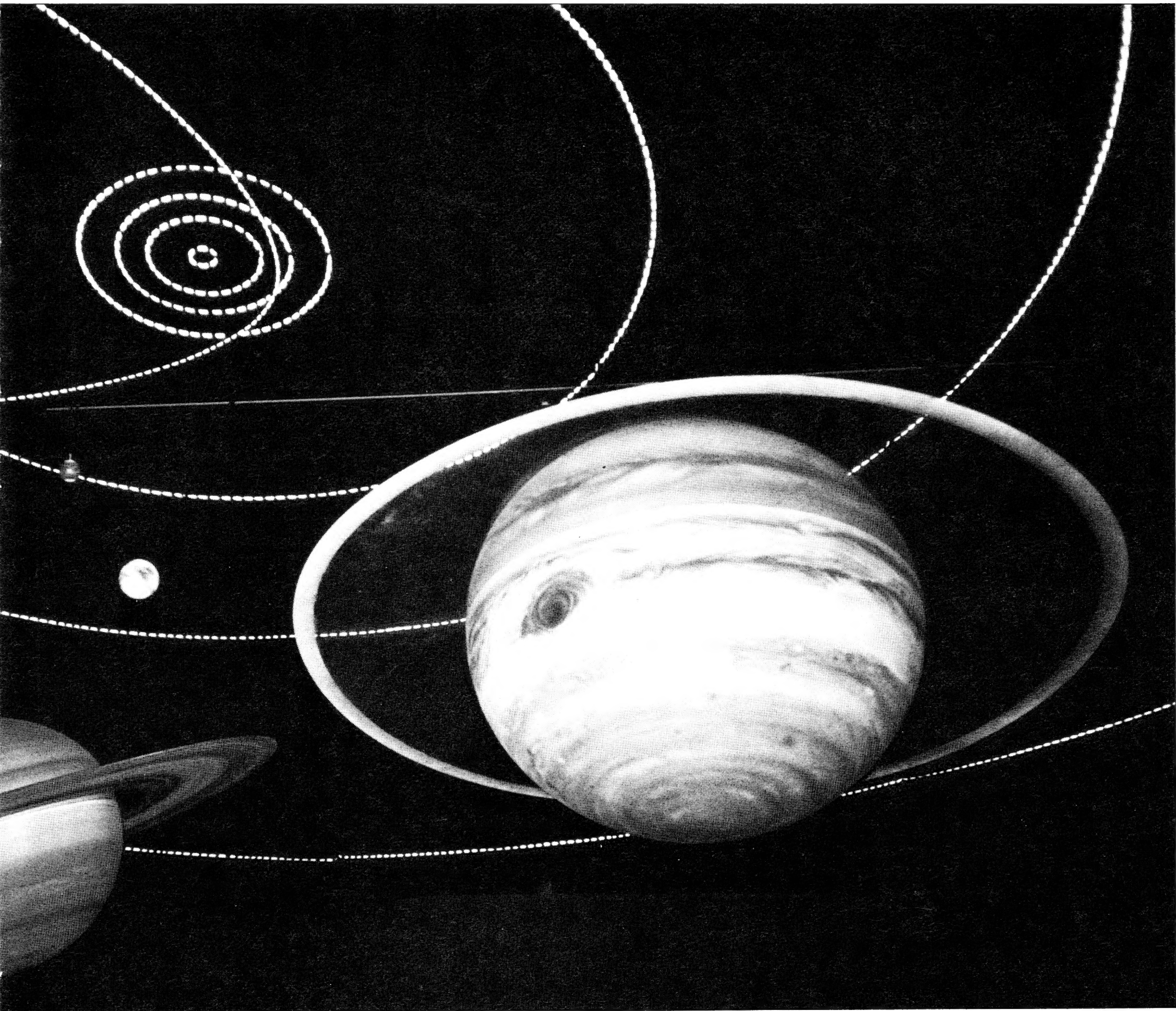
Steven B. Craig, *Acting Chairman*

MORRISON PLANETARIUM, opened in November 1952, was the seventh major planetarium built in the United States and the first to house a major star projector designed and built entirely in this country. Principal developers were Dr. Robert C. Miller, Dr. G Dallas Hanna, and Albert S. Getten.

This year six major shows were presented to the public: "The Universe in a New Light," written by Norman Sperling, "Light At the Edge of the Universe," "No, We

Don't Sell Plants at the Planetarium" "The Christmas Star," "Metal Moons," and "Starlight Odyssey," by Bing Quock. Total attendance to these shows was 108,128, including 18,197 complimentary admissions. "Exploring the Skies of the Season," the less-formal night-sky presentation, drew 28,944 visitors, 3,367 of which were complimentary. Total attendance (137,072) was 7 percent above last year's. Complimentary admissions (21,564) were up a dramatic number, reflecting a significant





Far left, Academy President Bruce A. Bolt describes the functioning of the shake table, or "Safe Quake," in the new Hohfeld Earth and Space Hall (left center).

Above, newly installed scale models of the planets and their orbits decorate the ceiling of Hohfeld Hall.

Left, the Museum's geophysical globe, donated by the BankAmerica Foundation, receives a new coat of paint before the opening of the Earth and Space Hall.

increase in Academy membership.

The school programs for elementary-grade students were modified this year. "Magic Sky," for pre-school and kindergarten classes, continues as a popular introduction to the night sky for very young children. Shows for grades one through six were offered, with a choice for the first time of either constellations or planets as the main topic. Nearly 23,400 students attended these shows, an increase of 8 percent over last year.

The long-running Laserium shows featured "Space Encounters," with music by Academy award-winning composer John Williams; "LaserQuake," featuring new-wave rock music; and "Dark Side of the Moon," featuring music from the classic rock album of the same name by the legendary group Pink Floyd. Paid attendance to Laserium shows was 49,981.

This year also saw the return of live music to the Planetarium, featuring a diverse selection of music from around the world. Concert music included electronic, Baroque, choral, Latin American, Japanese, pieces for clarinet and piano, original compositions for mandolin, and Irish, American, and Renaissance tunes. These concerts were attended by a total 905 people.

In addition to the usual requests for astronomical information—including sunrise and sunset times, moon phases, star & planet identification—the solar eclipse of 30 May generated a great deal of activity, including a free public Planetarium show about eclipses, as well as opportunities for safe eclipse viewing.

This year work also began on renovating the Planetarium's unique star-projection plates, which, after 32 years, started showing serious signs of deterioration. After consultation with the Zeiss Optical Works in Germany (the world's leading manufacturer of planetarium projectors) and with Goto Planetariums of Japan, it was decided that the job could be done locally. Leon Salanave, who determined the positions of the 3,800 stars in the original projector, was called in to assist, with a goal of increasing the number of stars in the Planetarium sky. This project is currently underway, with a tentative deadline of early 1985 set for completion. Former Planetarium Supervisor Tom Gates is project coordinator.

At the end of the year, extensive improvements of the sound system were also made, with the assistance of audio expert Paul Mundt. This project included conversion to four-track, digital-ready, stereo playback and the addition of extra speakers and new, state-of-the-art amplifiers from Streets Electronics.

EXHIBITS

Robert Kosturak, *Chairman of Exhibits*

CREATING fine natural history exhibits is specialized work, and the Academy has always been at its vanguard, advancing new techniques, and setting the standard for museums around the world. North American Hall, the Academy's original building in Golden Gate Park (dedicated in 1916), was the first edifice constructed in the United States especially for the display of habitat groups, or dioramas. John Rowley, renowned pioneer of group displays, designed and produced them, with a team of skilled artists and preparators. In 1934, Simson African Hall, with dioramas produced by Frank Tose, was the largest, most complete African exhibit in America. Finished in 1952 were African Annex, Lovell White Hall, Science Hall, and the Hohfeld Galleries. Alice Eastwood Hall of Botany opened in 1958. Cowell Hall was completed in 1968, and gala celebrations marked the 1976 opening of the Academy's most recent permanent additions, the Wat-tis Hall of Man and the Fish Roundabout.

The tradition of excellence continues: Mr. Robert Kosturak was appointed Chairman of Exhibits this year, bringing to the Academy a wealth of experience in the design and administration of major exhibits. A gifted professional, Mr. Kosturak has gained national recognition for his superlative work, including important installations at the New York Zoological Society (Bronx Zoo), the Field Museum of Natural History, and the Kansas City Museum of History and Science. He is warmly welcomed by the Exhibits department staff.

This year the striking paintings of Canada's leading wildlife artist opened an agenda of remarkable exhibits. Produced in cooperation with Mill Pond Press of Venice, Florida, *The Art of Robert Bateman* featured the largest selection of Bateman's vibrant

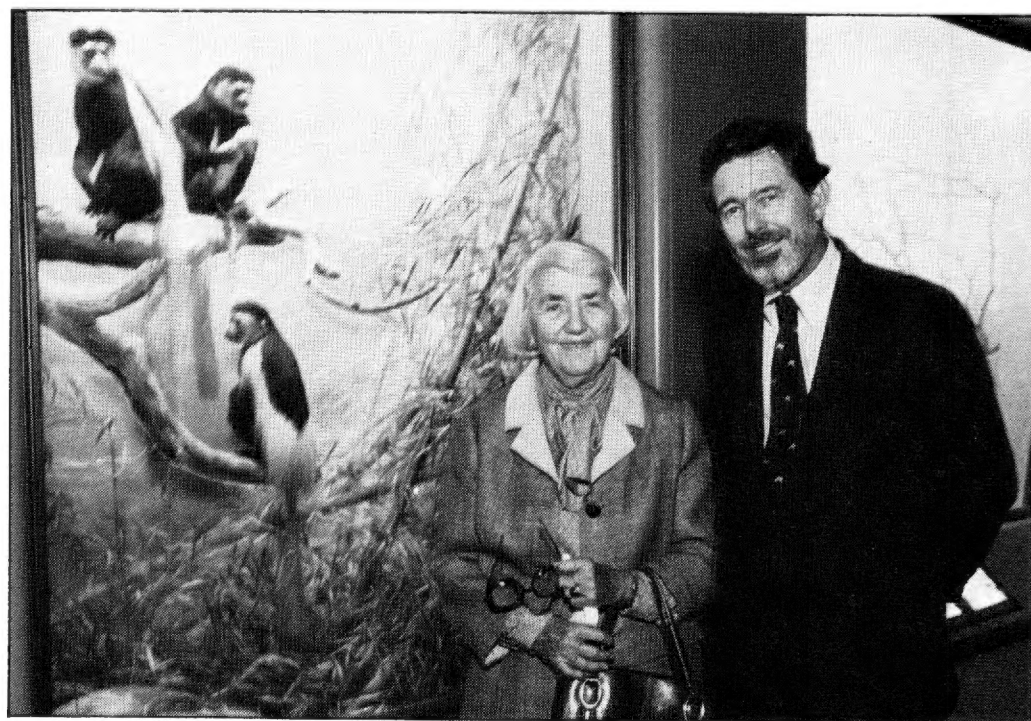
works ever presented in America.

Precious fossil resin, some from trees of primeval forests as old as 60 million years, was featured in the exhibit *Amber*. Collaborating with the Museum of Earth and Polish Academy of Sciences in Warsaw, hundreds of rare specimens, many with insect inclusions, were assembled for this major exhibit of the geology, mythology, and history of amber, including jewelry crafted by Poland's most important contemporary artists.

Superb watercolors by the celebrated artist John Langley Howard captured the fascinating world of *Tidepools*. Also, *Mountain Light*, the first public exhibition of Galen Rowell's photographs, featured breathtaking images from his treks to the world's highest mountains. *Andy Warhol: Endangered Species* presented stylized views of ten creatures now threatened with extinction.

The striking architecture of Anasazi ruins was explored in *Windows and Walls*, by gifted local photographer Jeffrey David Nicholas. *The Spirit of Muir Woods*, prepared in conjunction with the U.S. Park Service, was a photographic celebration of the famous Redwood grove at the foot of Mount Tamalpais. Other fine photographic exhibits included *Portraits of the Galapagos* by Larry Minden, and the winning entries of the Junior Academy's *Photo Contest for Young People*.

The art of nature printing, using pigments to transfer images of natural objects to paper, was explored in *Pressed on Paper*, a fine exhibit by the Smithsonian Institution Traveling Exhibit Service, as was the colorful *Mexico as Seen by Her Children*.





Left, Mrs. Paul L. Wattis visits the Museum's African Hall with Director Frank Talbot. A recent major renovation of the hall was made possible by a gift from Mrs. Wattis.

Top, artist Robert Bateman's realistic painting of a pair of skimmers was part of a large exhibition of his work displayed at the Academy during the year. Above, the artist describes one of his paintings to visitors at the exhibition opening.

Right, Andy Warhol's portrait of a Grevey's zebra is one of ten colorful silkscreens and prints exhibited in the show Andy Warhol: Endangered Species.



EDUCATION

Susan E. Douglas, *Chairman of the Education Department*

IN 1980 the separate offices of Adult Education and Travel, Junior Academy, and Docent Council were united under the title of the Education Department. The third office was expanded to include all volunteers in service to the Academy and renamed the Office of Volunteer Services in 1982. In 1983-84 year the Travel unit was placed in the Development division.

VOLUNTEER SERVICES

Diane Butler, *Coordinator*

Diane Butler coordinates the Office of Volunteer Services. Volunteers were not formally organized until the late 1960s, but they were involved in all phases of the development of the Academy from its inception. Today the Academy's volunteer roll numbers 698 persons who make a significant contribution throughout the institution. The Discovery Room Volunteers hosted 58,000 children and adults as they learned to appreciate nature utilizing the

exploratory method. Tidepool Volunteers interpret this popular "wet-hands" exhibit besides providing assistance on collecting trips and Aquarium maintenance. A corps of volunteers serve the Academy at the Information Desk, giving directions and information, and logging department visitors. Research Department Volunteers serve in capacities ranging from clerical to paraprofessional assignments.

The Docent Council, the largest group of volunteers, was led by Chairman Judy Prokupek. Throughout the fifteen-year history of the Council, the guidance of its founding Chairman, Geraldine K. Lindsay has been acknowledged and appreciated. Her passing this year was deeply felt by all docent and staff associated with the program. The thirty-four graduates of the 1983 Basic Course brought the council membership to 200. Tours were given for 357 student groups, Supervan presentations reached 222 classrooms and other centers, and the docents assisted at the Tidepool. The



Above left, Junior Academy photography contest grand prize-winner Gema Gonzales beside her award-winning portrait.

Left, Research Assistant Mary Ward explains the habits of the Junior Academy's screech owl during a "Science in Action" program in Cowell Hall.

Above, Junior Academy Supervisor Brian Gibeson demonstrates the arrangement of shark teeth to cautious students.

Above right, docent Sue Talbot points out the differences among species of California raptors to schoolchildren visiting the Museum's Bird Hall.

Right, students in the Junior Academy become familiar with "Julius Squeezer," the Museum's California gopher snake.





Council presented a workshop for 100 Bay Area teachers highlighting the educational services available at the Academy. Docents also participated in the Academy Open House and other special events for members and the community.

Each individual volunteer listed on pages 35 through 37 has earned the Academy's appreciation and admiration.

ADULT EDUCATION

Carol Prince, *Supervisor*

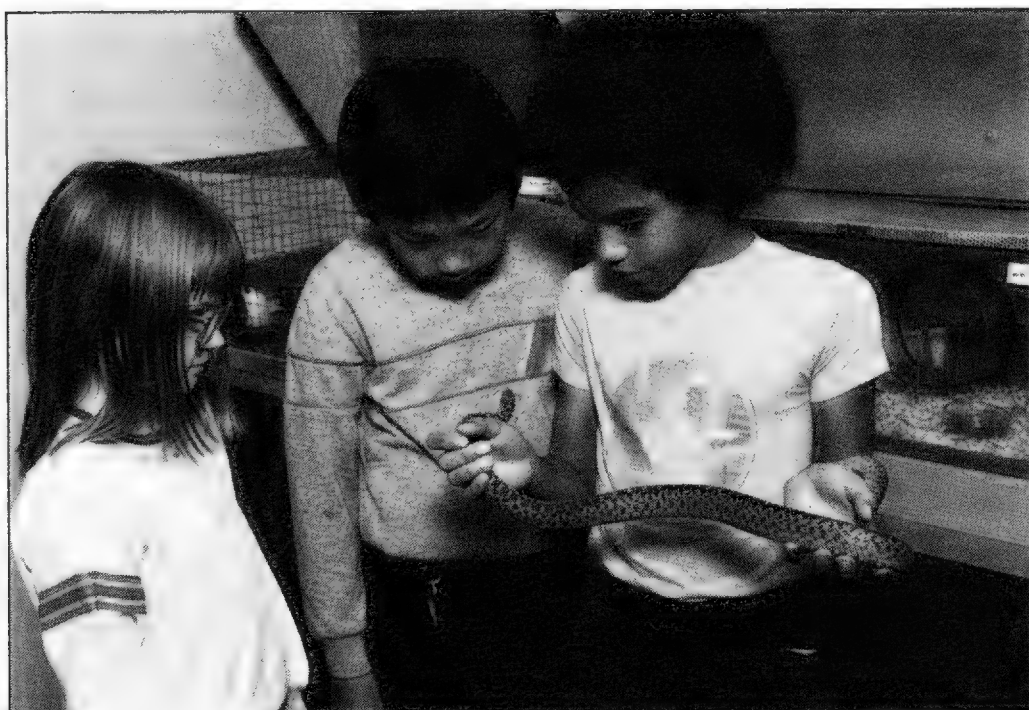
Carol Prince coordinated the study tours and classes available through the Activities Calendar three times per year. Fifty-nine classes from the Natural History of China to Aquatic Entomology were given with 1,467 participants. There were fifty-seven Study Tours with 1,891 participants, ranging from half-day maritime history walks to four-day trips to the Bristlecone Pines. Beginning in February, "Science in Action in Cowell Hall" has presented 129 short talks. These five- to ten-minute presentations by staff members, told the public either about the research in Academy departments or cur-

rent projects. Topics have included research on scorpion fishes, how to grow your own lobsters, and how the planets are being created for the new Earth and Space Hall.

JUNIOR ACADEMY

Brian Gibeson, *Supervisor*

The Junior Academy program, supervised by Brian Gibeson, provides quality activities in natural sciences for young people from six to sixteen. One hundred and five courses and field trips were offered in general biology, chemistry, and astronomy as well as specific courses in ichthyology, herpetology, marine biology, and biological illustration. Field activities included single day trips to NASA Ames, S.F. Bay Wildlife Refuge, Año Nuevo Reserve, and Pepperwood Natural History Reserve. The Midnight Safari, an overnight camp-out in Simson Africa Hall, gave over 160 young people an opportunity to experience the Academy by flashlight. There were 1,467 Junior Academy members at the end of the year.



PHOTOGRAPHY

Susan Middleton, *Photographer*

THE PHOTOGRAPHY DEPARTMENT was established in 1980 with Susan Middleton as full-time staff Photographer. Early activities involved designing, building, and equipping a darkroom, studio, and office implementing current technology to increase efficiency and quality of work produced. Equipping the studio is an ongoing process. In 1982 a part-time assistant was hired. The department was placed under Public Programs division in 1983, although it serves virtually every department at the Academy.

The Photography department is dedicated to producing quality images relating to natural history to promote the Academy and aid in research. Photographs were produced for numerous publications including the Annual Report, *Pacific Discovery*, Development and Public Information brochures, and Scientific and popular

publications. Ninety Coptic textiles from Anthropology were photographed for a planned catalog. Portraits of all the curators and studio photographs of collection specimens were made for a Development-office publication focusing on research at the Academy. Photographs of live animals in the Aquarium were produced for publication in *California* magazine.

Publicity photography for media distribution is also an essential function of the department and includes photographing exhibit openings and special events. Scientific photography is provided for the research departments to illustrate specimens and photographs are made for exhibits and the Aquarium. Graphic arts photography is produced for platemaking in the print shop and for Aquarium signage. Judy Steiner and Jim Patton have contributed to these activities as part-time photographic assistants.



Left, a self-portrait by the Museum and Aquarium's busy photographer, Susan Middleton.

Above, volunteer Verdi Miller helps catalog and preserve the Anthropology department's thousands of cultural artifacts.

Right, curator of Primatology Jane Goodall discusses her recent research on the chimpanzees of the Gombe reserve with Academy trustee Thomas Tilton and Director Frank Talbot.



RESEARCH

Frank Almeda, *Director of Research*

THE ACADEMY HAS a long-standing commitment to the proper preservation of its collections while insuring that they are accessible for serious study by the scientific community, state and federal agencies and other educational institutions. Curating and maintaining these collections is costly, but the Academy's stature as a national research resource, coupled with the heavy demands on our collections by scientists worldwide, has allowed us to attract collection maintenance support from the National Science Foundation for five departments: botany, entomology, herpetology, ichthyology, and invertebrate zoology and geology.

The job of Academy curators and research associates extends much beyond the discovery, inventory and description of organic diversity. As students of evolution they also elucidate the processes by which species come into existence and by which they succeed or fail. Their work may also span evolutionary aspects of behavior and ecology, the fossil record, and applied studies related to aquaculture.

In addition to their primary roles as researchers, our curators are called upon to serve in various administrative capacities. Because the demands on our research staff are multifaceted, we continue to closely monitor our staffing needs and devise ways that will promote scholarly research and increase productivity. During the past year, for example, we instituted an annual budgeted source of in-house funds designed to expedite research projects; we activated the G. Lindsay Field Research Fund, which now provides modest ongoing support for natural science field investigations by Academy staff and students; and we finalized plans to staff each of our departments with collection managers to shield curators from routine managerial activities. The following report gives some historical highlights and summarizes the activities and accomplishments of each department in the research division.

ANTHROPOLOGY

Robert Sayers, *Acting Chairman*

THE DEPARTMENT OF ANTHROPOLOGY was established in 1900 with the installation of Alfred Louis Kroeber as its first curator. Kroeber left the Academy in the aftermath of the 1906 earthquake; it was here, however, that he began the California Indian studies that were to earn him an international reputation. Kroeber's departure signaled a long period of quiescence for the department, which was not officially reactivated

until 1977, following the completion of Wattis Hall of Man. At that time, Dr. Dorothy K. Washburn, Associate Curator, assumed the newly created position of department chairman—a post she filled until 1983.

Dr. Washburn was a visiting fellow at Cornell University, Ithaca, New York and during 1983-84 delivered lectures at several



universities in the Northeast.

Dr. Sayers, Acting Chairman, completed work on his book, *The Korean Onggi Potter*, which will be published by the Smithsonian Institution Press in 1985. An analytical study of Mormon narrative will also appear in a forthcoming volume on folklore research in the United States. Dr. Sayers lectured at several local museums and universities on topics as diverse as Korean shamanism, Korean ceramics of the Yi dynasty, Southwestern Indian textiles, and the repatriation of ethnographic and archaeological collections to developing nations.

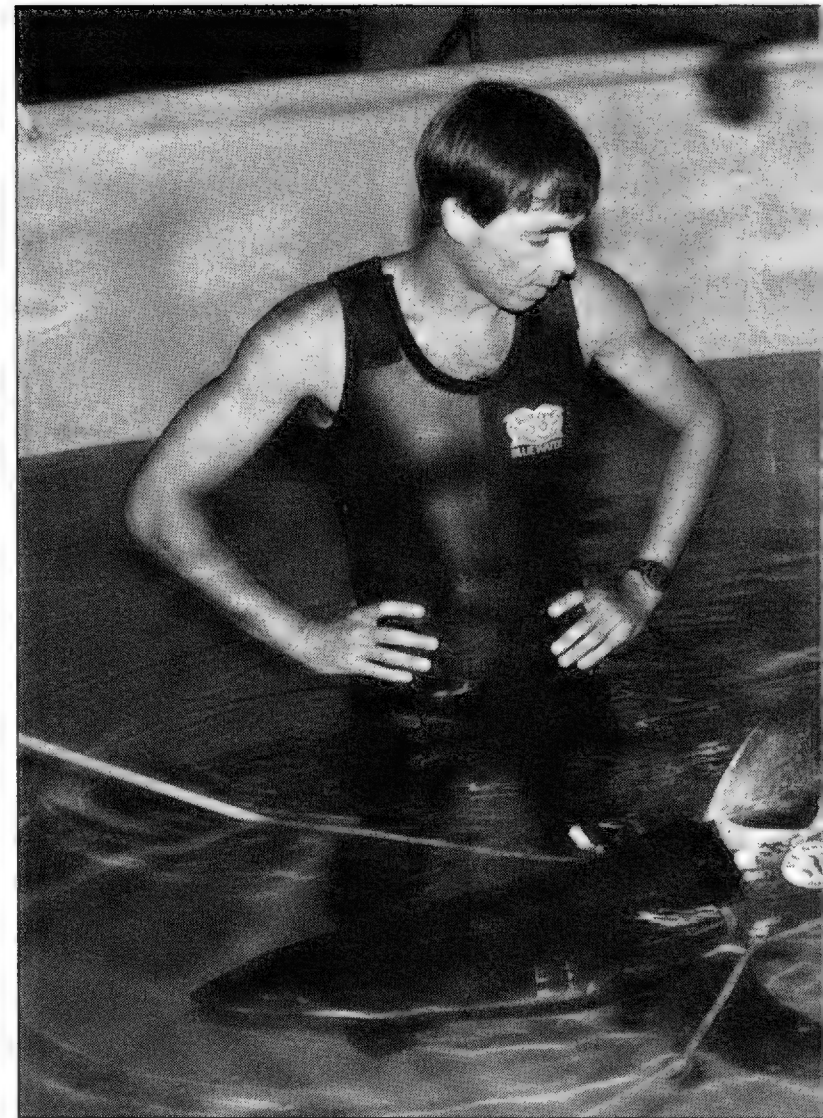
Research Archaeologist Dr. Carroll spent the year writing about the department's Carl Austin Rietz Coptic textile collection. Forthcoming publications include an NEA-funded catalog of that collection plus a technical paper ("Dating the Foot-Powered Loom: The Coptic Evidence") on a related subject.

Collections Manager Joan Bacharach left the Academy after ten years' service and is now a museum registrar for the National Park Service in Washington, D.C. In Ms. Bacharach's absence, Curatorial Assistant/Secretary Terri Berman assumed interim responsibilities for the accessioning of new collections and the processing of loans. She was assisted by Photographer Jim Patton, student interns Julie Johnson and Heidi Buchanan, and volunteers Verdi Miller, Mary Black, and Janet Aitken.

Several significant additions were made to anthropology's collections during the year. Mr. and Mrs. Don Fellers of Santa Rosa ceded to the Academy the Rollo P. Beck Oceania Collection—226 rare ethnographic specimens collected, with excellent documentation, in New Guinea and the Solomon Islands in the 1920s. Mr. and Mrs. William K. Shepard of Alamogordo, New Mexico, gave us some thirty pieces of Ban Chiang pottery from Thailand; Jacquenette C. Ostheimer of Santa Fe, New Mexico added several important specimens to our Ostheimer Hawaiian Collection; Robert P. Conroy of Sparks, Nevada donated two coral burial urns from Okinawa; and Myrna Chung of San Francisco gave us seventeen fine pieces of Southwestern Indian jewelry in memory of her daughter, Yvonne Chung Baxter. Other donations of materials from the Pacific, Asia, and the Americas came from Hilde M. Askenback, Steve Craig, Mrs. John Galgiani,

Mr. and Mrs. William A. Harding, Dr. John R. McLaren, Dr. Francis J. Rigney, Jr., Helen Snow Sigurdsson, and Martha Usinger.

Finally, the department's contributions to public programming at the Academy included the showing (organized by Terri Berman) of films by award-winning ethnocinematographer Calogero Salvo, a December presentation of Christmas Trees of the World in Cowell Hall, and the weekly Traditional Arts series in Wattis Hall. The latter program was jointly funded by NEA-Folk Arts and the Rietz Food Technology Foundation. Folklorist and Program Coordinator June Anderson presented the performing, craft, and food arts of some twenty-nine ethnic groups resident in the Bay Area, from Ukrainian Easter egg making to West Javanese martial arts and gamelan music, from Lao-tian fabric work to Appalachian clogging, from the preparation of Afro-Caribbean food to Chinese acupuncture and herbalism. In May, Ms. Anderson and Dr. Sayers discussed the program in formal sessions at the Annual Meeting of the California Folklore Society, where it was widely praised as a model for other museums and public institutions.



AQUATIC RESEARCH

John E. McCosker, *Curator*

THE DEPARTMENT OF Aquatic Research was established in 1982 to facilitate use of the Aquarium for research purposes. The unique facilities and specimen collections have provided research opportunities for graduate students and animal behaviorists as well as enabling biomedical studies and a variety of applied studies related to aquaculture. All projects are either grant-funded, contractual, or supported by the researcher's home institution.

A wide variety of topics and organisms were studied this year, ranging from microscopic luminous bacteria to white-sided dolphins. Dr. Wayne Lanier continued his studies of the development of *Mycena citricolor*, a pathogenic fungus of economic importance to the Central American coffee industry. Dr. McCosker and Research Associate Bill Bennetta solved a unique problem for Chevron, Inc., which concerned large eels that inhabit deep-sea oils rigs. They identified an environmentally harmless chemical repellent and delivery system to repulse eels that clog and damage drill pipes. Elizabeth Galbreath continued her research, in association with Dr. Hal Markowitz of San Francisco State University, on symbol discrimination by Pacific white-sided dolphins. Aided by a small grant and several staff and volunteers, Dr. Markowitz constructed a viewing "blind" above the marine mammal display. Michael Russell began a se-

ries of preliminary experiments to test the camouflage ability of flatfishes and turbot to match the appearance of their substrate to discover the neural pathways involved in the color-change mechanism.

Several Aquarium staff biologists pursued research projects related to their normal tasks. Bruce Hiler successfully bred and raised dendrobatid poison arrow frogs. Ed Miller, working with Dr. Syd Kraul of the University of Hawaii, successfully raised the larvae of yellowtail that had spawned in the Roundabout. Miller's work on luminous bacteria, conducted with John McCosker and microbiologists from the Scripps Institution of Oceanography, was completed and published. John Hewitt was accepted in the graduate program at San Francisco State University and will continue his shark physiology research for his thesis. Christina Slager and Research Associate Dr. Peter Ward continued their investigations of nautilus growth and behavior and, in so doing, established a longevity record for *Nautilus macromphalus* and *N. pompilius* in captivity. Dr. McCosker continued his NSF-supported studies of ophichthid eel systematics and compiled data concerning white shark biology.



Top, Aquarium Director John McCosker and Assistant Curator John Hewitt attempt to save the life of a young great white shark rescued from a fisherman's net.

Above, Curatorial Assistant Colleen Sudekum presses freshly collected botanical specimens in preparation for their preservation in the Botany department herbarium. Right, Preparator Debbie Wilson glues dried plant specimens to durable herbarium paper. Typed labels identify the species.

BOTANY

Dennis E. Breedlove, *Curator and Chairman*

BOTANICAL RESEARCH began at the Academy in 1853 with Dr. Albert Kellogg, founder of the Academy. In 1906 the collection was destroyed with the exception of 2,000 types saved by Alice Eastwood. The department was reestablished in 1915 and has actively pursued investigations in western North America, Baja California, the Galapagos Islands, and, in the past 15 years, northern Latin America. In 1976 Stanford University combined its Dudley Herbarium with the herbarium of the Academy. At present the combined herbaria house more than 1.5 million specimens, including more than 10,000 type-specimens, from around the world.

The size of the herbarium increased by some 15,000 specimens during the year. This brought our total holdings to approximately 1,520,000 mounted specimens. Our active and continuing interest in the flora of tropical America is reflected by significant accessions from this region, as well as from California and the western United States, Mexico, and China. The Botany department loaned a total of 7,000 specimens in seventy transactions to professional scientists and graduate students at foreign and domestic institutions. The department assisted 350 professional scientists and graduate students who came to study collections or consult our holdings of botanical literature. In addition, twenty-four tours were given to visiting groups from colleges, universities, and special-interest organizations. The staff also answered over 250 inquiries from members, physicians, regional poison centers, state, federal and private agencies. The project to microfiche our 10,000-specimen type collection was completed.

On 1 October 1983 the National Science Foundation awarded a three-year grant of

\$228,900 to support the care and use of the department's systematic collections. These funds provided salaries for two curatorial assistants, the purchase of herbarium cases, a microscope, and a computer system.

Drs. Breedlove and Almeda spent seven weeks collecting plants and making observations on plant distribution in Mexico. Approximately 8,000 specimens were gathered.

During the year Dr. Breedlove sorted more than 20,000 specimens for exchange from his Chiapas work; he also completed a manuscript on ethnobotany to be published by the Smithsonian Institution. He continued his monographic studies of the genus *Quercus* and prepared manuscript for the *Flora of Chiapas*.

Dr. Almeda was appointed the Academy's director of research effective 1 July 1983. During the year he completed manuscript for fourteen of the twenty-five genera of Melastomataceae for the *Flora of Chiapas* and began work on a floristic treatment of adventive Hawaiian Melastomataceae to be included in the forthcoming *Guide to the Flowering Plants of the Hawaiian Islands*. He also led a Fall Foliage Cruise of the Hudson River Valley, which included a tour of New York museums.

Dr. Day's major effort has been to integrate the herbarium collections. She also did field work in the Sierra Nevada and North Coast Ranges of California in connection with research on a species complex in the genus *Gilia*.

Dr. Bruce Bartholomew received funding from the National Geographic Society as well as the National Science Foundation to launch a joint U.S.-Chinese plant collecting expedition in the People's Republic of China





during the summer of 1984.

Dr. Leslie Landrum, the Tilton Postdoctoral Fellowship recipient, joined the staff in September. He is currently working on taxonomic treatments of genera of the subtribe Myrtinae of the Myrtaceae. A manuscript of about 400 pages has been submitted to *Flora Neotropica* for review. Three short papers on the Myrtaceae and a biography of the botanist B. A. Krukoff were completed at the Academy and are in press.

Gordon True, long-time research associate and Academy fellow died on 9 March 1984. Gordon's regular work in the department culminated in a definitive checklist of Nevada County plants. His cheerful presence will be missed by all who had the pleasure of working with him.

ENTOMOLOGY

Wojciech J. Pulawski, *Chairman and Assistant Curator*

BY 1862 the early insect collections of the Academy had become large enough that a department of Entomology was established. Dr. Hans Hermann Behr—lepidopterist, botanist, and medical doctor—served as its first curator. Most of this collection was subsequently destroyed by the fire following the 1906 earthquake, with the exception of 300 type-specimens of Baja California Coleoptera, Hymenoptera, and Hemiptera. These and some 4,000 specimens acquired in the Galapagos Islands in 1905–06 formed the basis of the re-formed collection. The department is now worldwide in scope, is considered without equal in western North America, and is one of the four largest collections in the United States.

The collection, which is consulted by scientists and students around the world, presently contains about 7,320,750 processed insects, arachnids, and myriapods, of which 135,649 were added during the past year. These came from 171 sources: individuals, institutions, or expeditions.

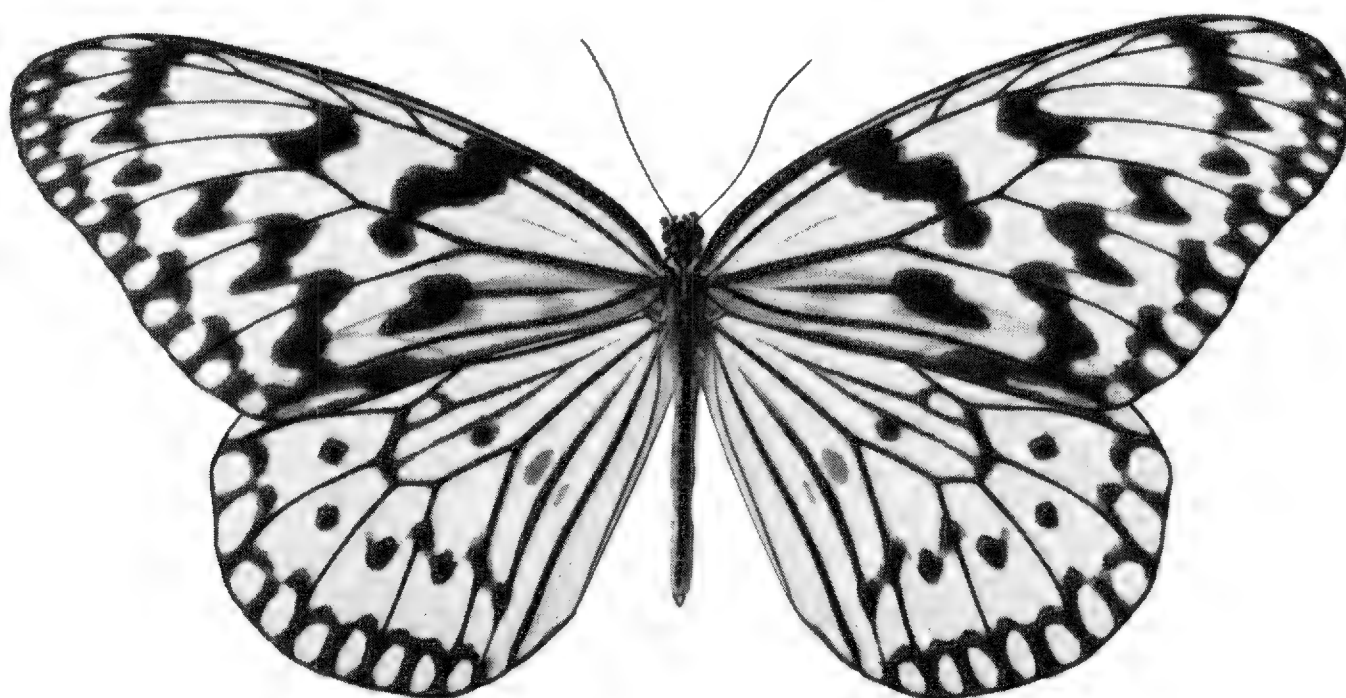
The Department houses the newly established interdepartmental scanning electron microscope laboratory. This welcome instrument is operated by Mary Ann Tenorio. Funds for this scope and initial purchase of equipment were provided by the National Science Foundation with Drs. Kavanaugh and Pulawski as principal investigators.

Also established as a permanent program was the Exline-Frizzell Fund for Arachnological

Research, and five grants-in-aid totaling \$3,000 were awarded in cooperation with the Liaison Committee of the American Arachnological Society.

During the year, the National Science Foundation provided \$75,000 for the care and use of the systematic collections of the Entomology Department, specifically for supplies and technicians' salaries.

The research activity of Dr. Arnaud continued with his study of Nearctic Thaumaleidae, the preparation of a catalog of CAS Tabanidae, and the production of a Festschrift volume on Tabanidae honoring Dr. Cornelius B. Philip. Dr. Kavanaugh continued his monographic study of the Nearctic species of *Nebria* and other projects, with reports in press or manuscript. Dr. Pulawski continued his study of North American *Tachysphex* wasps, completing distributional maps and keys for the identification of all North American species. Mr. Lee's major as-





Above left, Botany department Collections Manager Bruce Bartholomew (center) stands in front of a living dawn redwood (genus *Metasequoia*) during his research excursion to the People's Republic of China. The tree is the "type tree" from which the species was described. [Photo by Bruce Bartholomew.]

Left, an Asian paper butterfly specimen in the Entomology collection.

Above, the foot of a tachinid fly, showing the tarsal claws and pads, magnified to 350 times lifesize by the Academy's scanning electron microscope. [Photo by Mary Ann Tenorio.] Tachinid flies are a subject of study by Entomology Curator Paul Arnaud. Right, Curatorial Assistant Mary Ann Tenorio operates the sophisticated electron microscope.



signment was the curation of the large and significant Dr. Herbert L. Stahnke collection of scorpions. Dr. Briggs continued his investigation of the biology of California caves, as well as a taxonomic study of southwestern laniatorid harvestmen in collaboration with Mr. Ubick. Dr. Smith continued his work on the *Atlas of Insect Anatomy*. Dr. Weissman's continuing study of the zoogeography, systematics, and bionomics of Orthoptera of Baja California was supported by a three-year grant from the National Geographic Society. Members of the department also presented an internship program for applicants with special interests and skills in entomology.

In the field, Dr. Kavanaugh worked in the Queen Charlotte Islands, supported in part by a grant from the Penrose Fund, American Philosophical Society. Field study took Dr. Pulawski to Baja California, the southwestern United States, and to the tropical rainforest and coastal desert of Peru, the latter financed by a grant administered by the Smithsonian Institution. Dr. Ross continued work on his monograph of the insect order Embiidina with field work in Europe, North Africa, and Turkey. Ms. Hunter worked at Cuzco Amazonico, a field station in the lowland rainforest of Peru, collecting insects for a cooperative project between the Academy and the Peruvian scientific community. Mr. Lee collected and studied insects and arachnids of maritime and terrestrial habitats in Baja California with Dr. Weissman, and at the Bishop Museum in Hawaii. Dr. Briggs attended the Ninth International Congress of Arachnology in Panama and presented a paper.

A total of 74,523 specimens were loaned to 187 individuals in 252 transactions during the year; 86 loan recipients were researchers in countries other than the United States.

The Department received 1,860 visitors, including 428 visits by professional entomologists, 87 by graduate students, 123 by undergraduate or high school students, and 1,222 by others who came as individuals or in groups to use its facilities.

HERPETOLOGY

Robert C. Drewes, *Chairman and Assistant Curator*

ALTHOUGH THE Herpetology department was not established as a separate unit until the 1870s, the Academy acquired its first herpetological specimen, a Galapagos tortoise, in January of 1854, just seven months after the founding of the institution. The history of the department is a colorful one and includes the activities of an international spy and the death of one of our past chairmen under clouded circumstances. In the earthquake and fire of 1906, the department lost all but twelve specimens. Through the efforts of curators, research associates, and colleagues, the department's collections have since grown to nearly a quarter of a million specimens and are currently ranked fourth largest in the western hemisphere.

During 1983–84, several important collections were cataloged from South Africa, Egypt, Australia, and the southwestern United States; additional material from New Caledonia and Iraq awaits processing. Service to the academic community continued at a high level with a total of 152 loan transactions involving 3,442 specimens. During 1983–84, the staff handled requests for information on 5,131 specimens.

The year was particularly busy in terms of visitors (149 "visitor days"). Our NSF facilities grant provided funds for working visits by Dr. Ronn Altig of Mississippi State University, Dr. Douglas Rossman of Louisiana State University and Van Wallach of the San Diego Natural History Museum. Research Associate Dr. Angel Alcala of Silliman University, on a year-long visit to the U.S., spent several months in the department working with Resident Associate Dr. Walter Brown. Visitors were also received from Harvard, the South Australia Museum, and the University of Adelaide. The department restroom was remodeled into a laboratory to accommodate long-term visitors Mr. Saman Afrasiab of the University of Baghdad (8 months), Dr. Marcos Freiberg of Argentina (1 year) and Dr. Jaishri Menon, of the University of Baroda, India (2 months).

Dr. Drewes continued his research on African amphibians, completing several manuscripts. In January, a grant from the G. Lindsay Field Research Fund enabled him to address the Fifth International Congress on African Amphibia, held in Natal, South Africa. Following the meetings, Dr. Drewes

led a highly successful, joint CAS–British Museum expedition through Natal and Cape Province, collecting nearly 500 specimens, some previously unrepresented in either museum. Several live specimens were later displayed in the Aquarium.

Dr. Leviton continued as executive director of the Pacific Division, AAAS and coordinator of computer services for the Academy. He attended a number of professional meetings during the year, and in the fall, delivered a paper at the vertebrate paleontology meetings in London. He completed two papers on Southwest Asian reptiles. The Pacific Division, AAAS publishing program, initiated and directed by Dr. Leviton, produced three symposium volumes this year, one of which deals with evolution of Galapagos organisms.

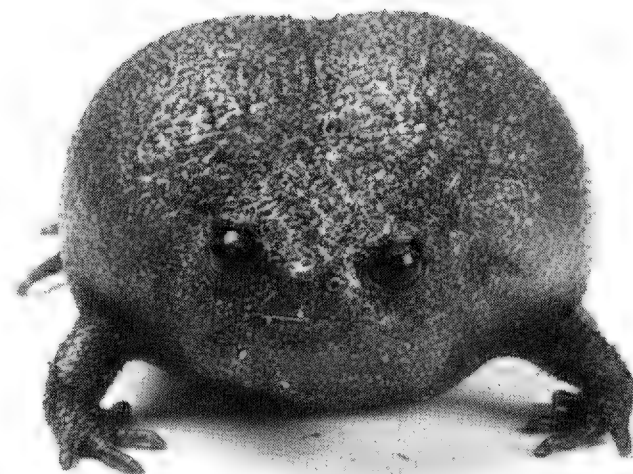
Dr. Jacques Gauthier completed his year in the department as Herpetology Fellow, having finished six manuscripts on diapsid phylogenetic relationships. In addition, he taught in the CAS/SFSU graduate course "Advances in Biosystematics," addressed the Bay Area Biosystematists, and participated in the second annual Fellows' Symposium "The Evolution of Avian Flight." Dr. Gauthier left for a three-year post-doctoral fellowship at the University of Michigan.

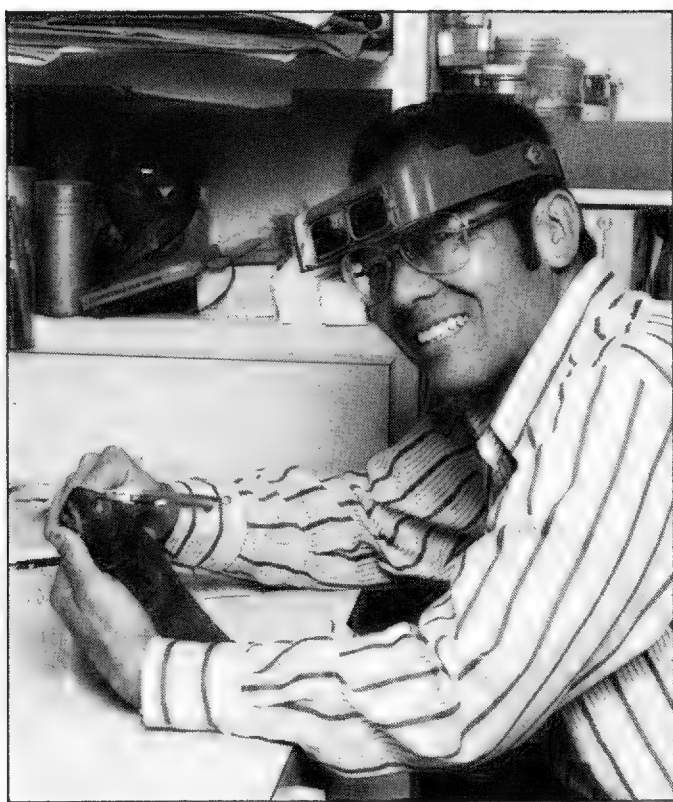
In April, under the direction of Collections Manager Jens Vindum, the department began the sale of its antique, glass-topped jars to the membership and later to the public at large. Proceeds of the sale will go toward replacing the jars with more modern, economical closures and toward enhancing the department's research and field activities.

The entire staff participates in our popular annual event, "Things That Go Bump in the Night," presented through the Adult Education program.

Above right, a live specimen of the plain rain frog (Breviceps fuscus), brought to the Academy from South Africa by Curator of Herpetology Robert Drewes.

Right, Herpetology Collections Manager Jens Vindum oversees the protection of the department's valuable research collection of Galapagos tortoises.





Top (left to right), Professor Xin-Luo Chu of the Kunming Institute of Zoology of Academia Sinica in the People's Republic of China examines ichthyological specimens with Academy Research Associate Walter Rainboth and Research Biologist Tyson Roberts.

Above, Curator of Ichthyology Tomio Iwamoto studies a specimen of a new species of grenadier taken in deep waters off Australia.

Right, Curatorial Assistant Michael Hearne holds up a preserved specimen of a rare coelacanth, an existing fish species representing a group of primitive fishes once believed to have given rise to all four-footed animals.

ICHTHYOLOGY

Tomio Iwamoto, *Chairman and Associate Curator*

THE ICHTHYOLOGY DEPARTMENT has a rich history within the Academy. William O. Ayres, the Academy's first curator, described more than forty California fishes. David Starr Jordan, the world's preeminent ichthyologist, was the Academy's president for three terms. His student, ichthyologist Barton W. Evermann, was director from 1914 to 1932. During Evermann's directorship, the Academy moved to its new site in Golden Gate Park and the Steinhart Aquarium was constructed. The collections grew under the chairmanships of H. Walton Clark, Wilbert H. Chapman, and W. I. Follett (now Curator Emeritus). In 1967, Earl S. Herald, associate director for the Aquarium and curator of ichthyology, received a NSF grant to renovate the Department and transfer the George Vanderbilt collection (40,000 lots) to the Academy. The Stanford collections (75,000 lots) were subsequently incorporated making the present collection one of the greatest in the world.

The ichthyological collections contain an estimated 1.5 million specimens in roughly 188,000 lots. During the year 3,596 specimens (713 lots) were added, including 140 type-specimens. Some noteworthy additions include Lake Nasser fishes from Dr. Ronald Fritzsche (Humbolt State University), midwater fishes from Monterey Bay from Dr. Gregor Cailliet (Moss Landing Marine Laboratory), deepwater fishes from Pt. Sur from Eric Anderson, and small but valuable exchange specimens from institutions in China and India.

Dr. Iwamoto's research on fishes was directed at completing studies of southeastern Pacific grenadiers (a joint effort with two Soviet ichthyologists) and Antarctic grenadiers. He spent three weeks at the Museum of Comparative Zoology (Harvard University), the Smithsonian Institution,

and Los Angeles County Museum of Natural History examining specimens in conjunction with these studies.

Dr. William N. Eschmeyer rotated out as Director of Research (preceded by Chief Curator) after more than six years in that administrative role, and returned full time to his research on scorpionfishes. He completed manuscripts on scorpionfishes of southern Africa and of the western Indian Ocean, and collaborated on several studies with Dr. Kaza Rama-Rao, who spent three months visiting the department. He worked with Dr. Christine Karrer on oreosomatid fishes, made a short cruise off Hawaii, after which he studied scorpionfishes at the Bishop Museum, and spent a week in May on research at the Smithsonian.

Dr. Tyson R. Roberts completed several manuscripts on his research on fishes and had four papers published during the year. He is completing a 700-page monograph on western Borneo freshwater fishes, a study based on his collections of 7,000+ specimens made in July and August 1976.

W. I. Follett, Curator Emeritus, continued his studies on California fishes and conducted field work on the island of Hawaii for a pending archaeological project. He assisted other scientists on nomenclatural problems.

Mrs. Lillian J. Dempster assisted Mr. Follett and advised others on taxonomic, nomenclatural, grammatical, and literature problems. She serves as Index Editor of the *Proceedings* and as co-Index Editor (with Iwamoto) of *Copeia*.

The department's ongoing NOAA/BLM grant to serve as voucher-specimen repository for collections made in studies of the Alaskan outer continental shelf was funded



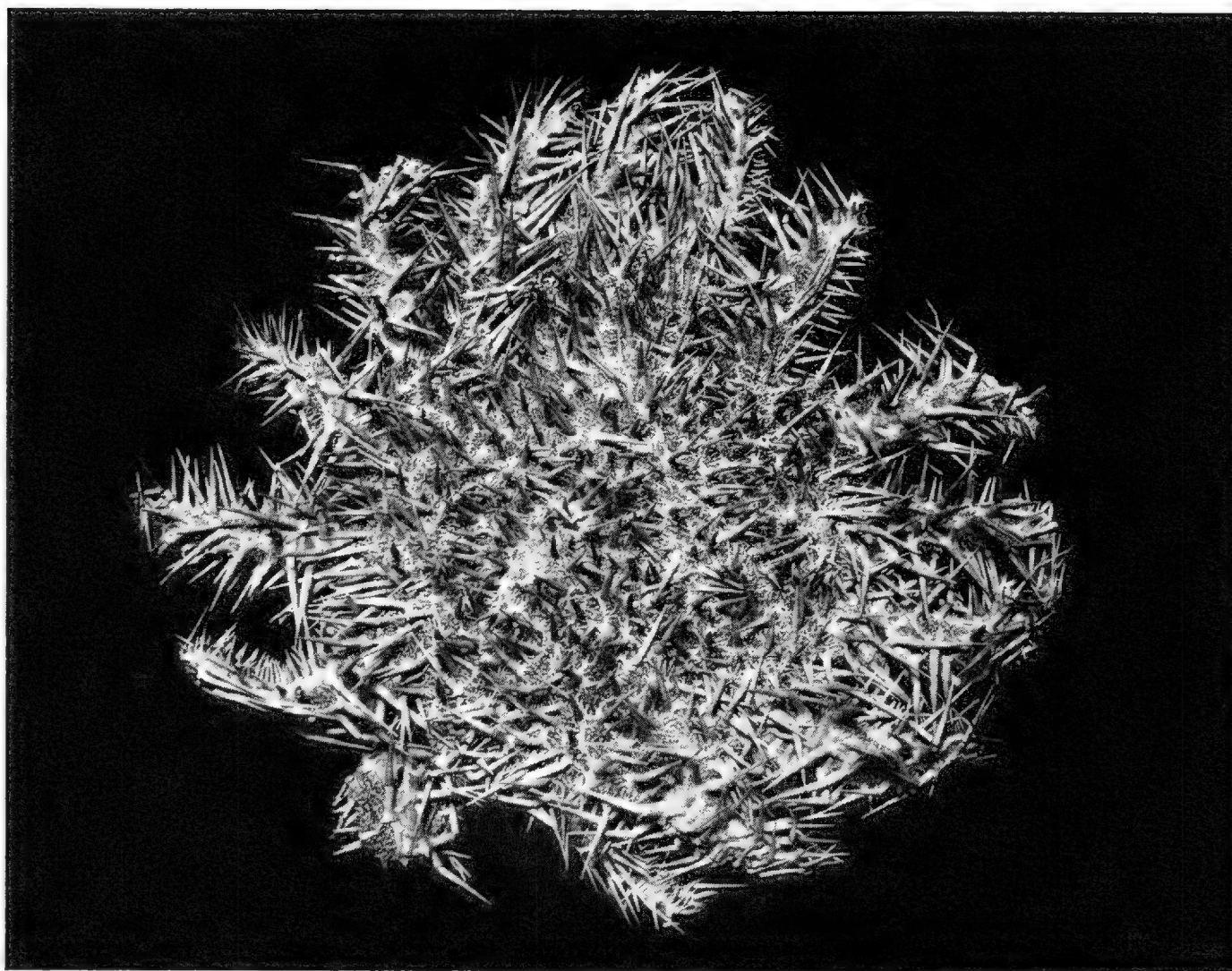
for \$31,310. Scott Cutler served as Project Manager.

Our commitment to the ichthyological community continued with 110 loan transactions involving 2,815 specimens in 630 lots. Notable among 132 visiting ichthyologists and graduate students were Dr. Xin Luo Chu (Kunming Institute, People's Republic of China), Dr. Christine Karrer (Museum and University of Hamburg), and Dr. Kaza Rama-Rao (Zoological Survey of India). Dr. Chu's North American visit was sponsored by the Academy and coordinated by Dr. Roberts, who has an interest in Southeast Asian freshwater fishes. Dr. Chu studied fishes with Dr. Roberts for a total of three weeks, spending the remaining time visiting museums in the East.

The National Science Foundation provided \$64,246 in the fourth year of a five-year grant in support of the department's collections. Two curatorial assistant positions and curatorial supplies are the main funding items of this grant.

Dr. Lynne Parenti joined the staff in April as Research Biologist on a one-year NSF grant to study the systematics and biogeography of phallostethid fishes, a peculiar group of tiny Indo-West Pacific marine fishes related to silversides.

Dr. Stuart G. Poss was appointed Collections Manager in September. In this new department position, he has been charged with overseeing the day-to-day activities of the department. Under his direction the volunteer staff increased to thirteen (from three the previous year), mostly through our commitment to the Enterprise Program for San Francisco high schoolers. He has computerized many department curatorial and record-keeping activities. Director Talbot charged him with drawing up plans and equipping a marine field laboratory in Papua New Guinea, a joint project of the Academy and several universities funded by the Christensen Foundation. His research interests lie with peculiar groups of scorpionfish relatives.



INVERTEBRATE ZOOLOGY AND GEOLOGY

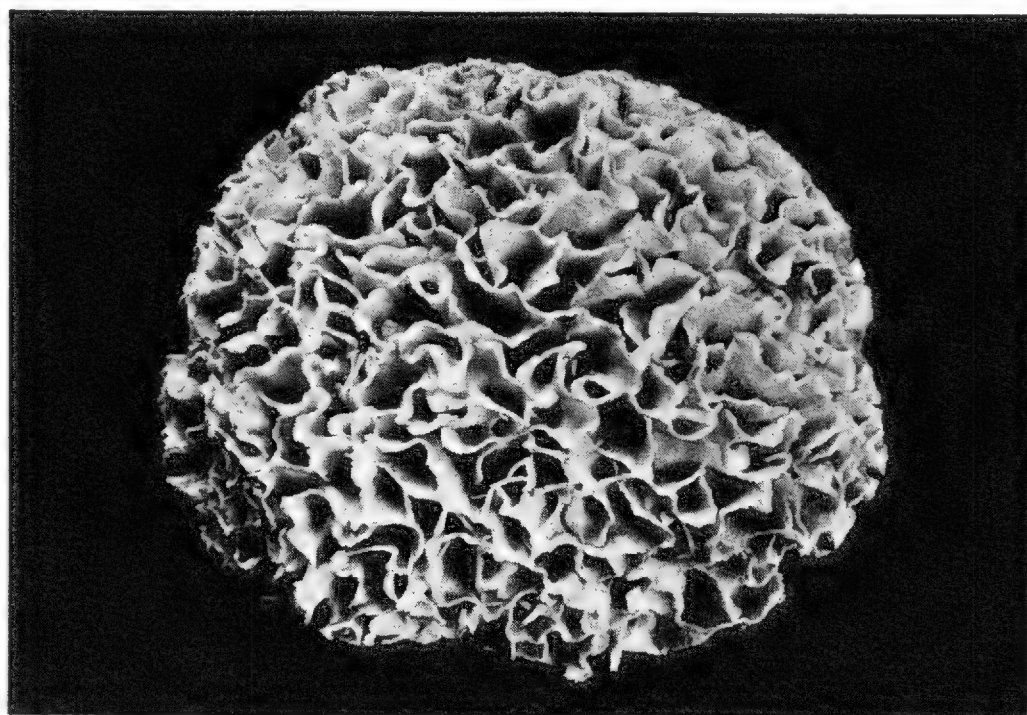
Peter U. Rodda, *Chairman and Geologist*

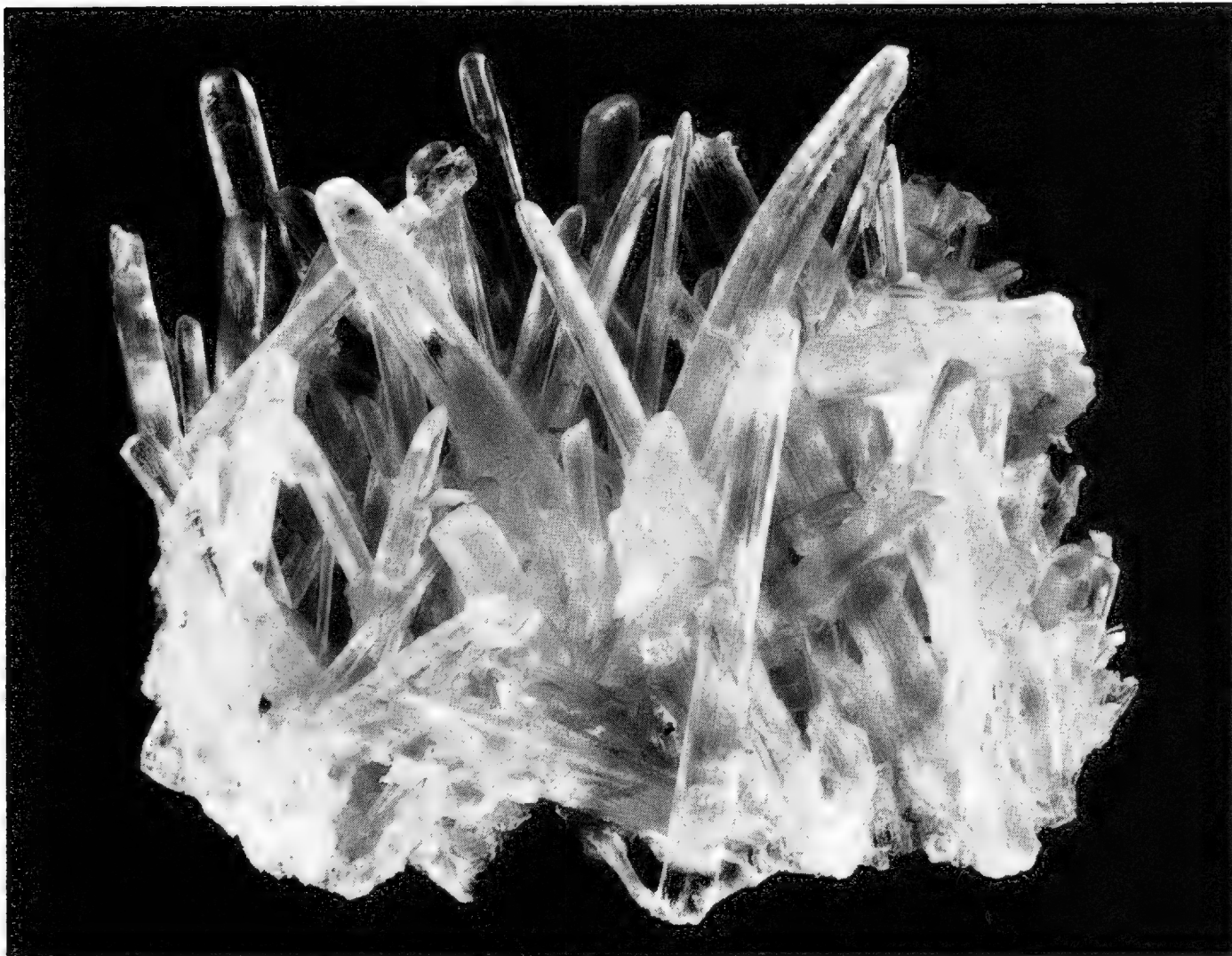
THE ACADEMY'S COMMITMENT to the field of geology and invertebrate zoology was initiated by two of the institution's founders, John B. Trask and Lewis W. Sloat. Trask, the first (unofficial) state geologist of California contributed minerals and fossils, and Sloat, an amateur conchologist, donated a cabinet of mollusk shells to the fledgling Academy. Although few formal records exist, the Academy, during the succeeding decades, acquired extensive collections of invertebrates, fossils and minerals. Virtually all of these collections, and the

accompanying records, were destroyed in the earthquake and fire of 1906. The Galapagos expedition, returning later that year, brought important collections of living and fossil invertebrates and re-established these disciplines. During the next several decades the Department of Paleontology rebuilt the fossil collections and also acquired significant collections of living invertebrates, most notably the Henry Hemphill shell collection. The diatom collection was built by G Dallas Hanna, long-time curator of paleontology, begin-

Specimens from the Invertebrate Zoology department collections: above, a crown-of-thorns sea star, an inhabitant of warm seas, and, right, a large colony of bryozoa. [Photos by Lloyd Ullberg.]

Facing page, top, from the Geology department's minerals collection comes this superlative example of selenite, a variety of the mineral gypsum. [Photo by Lloyd Ullberg.] Left, Curator of Geology Peter Rodda examines a fossilized ammonite he collected in northern California. Right, an ammonite in the department's collection. [Photo by Peter Rodda.]





ning about 1920. The Academy became a major mineralogical institution in 1954 with the acquisition of the Magnus Vonsen collection. In 1960 the Department of Invertebrate Zoology was established and, under the direction of Allyn Smith and Welton Lee, proceeded to build large and important collections of living invertebrates. During the last ten years all collections of these two departments, living invertebrates, fossils, diatoms, and minerals, have more than doubled in size.

This year, under the supervision of Robert Van Syoc, Collections Manager, 3,500 specimen lots of living invertebrates were received in 175 accessions; 17,000 specimen lots of newly and previously accessioned material were cataloged into the collections. Large donations were received from Antonio J. Ferreira, Marjorie Schmelzer, and Eugene Coan. In addition,

500 specimen lots of fossils were received in ninety accessions, including a large collection of Pleistocene invertebrates from the Galapagos received from William Pitt, Carole Hickman, Jere Lipps, and Matthew James; and several display quality specimens of trilobites, ammonites, and mammals donated by Arthur Court.

Margaret Hanna continued to care for the large diatom collection. Cataloging of the A. L. Brigger slide collection, a major unit of the diatom collection, has been pursued vigorously by volunteer diatomists. The second meeting of the Bay Area Diatom Group was held in the Diatom room in February.

Jean DeMouthe continued to supervise the mineral collection, which now contains 13,849 specimens; 403 specimens were accessioned during the year. Noteworthy donations include specimens from Dr. Julien

Hoffman, A. L. McGuinness, Arthur Court, and extensive collections of bulk mineral and rock material from both Miss Virginia Leach and Mrs. Melba Deidrick. Notable species and rare species were also acquired by trade with Harvard University, Luis Leite of Portugal, and Cureton Minerals of Tucson.

Loans of 3,480 specimens of living invertebrates, fossils, diatoms, and minerals were made in 321 separate transactions. The two departments received approximately 630 visitors during the year. Dr. Barry Wilson, director of the National Museum of Victoria, Melbourne, Australia, spent three months in the departments conducting research on living and fossil mollusca. A visiting scientist program, partly funded by the National Science Foundation, enabled us to bring seven invertebrate zoologists to the Academy to study our holdings in their specialties. In return the visiting scientists provide expert identifications and other invaluable collection support.

The National Science Foundation provided \$49,000 for support of collections through the second year of a three-year grant for the mollusk collection. The grant provides salaries for curatorial assistants and funds for supplies and equipment.

The Academy was awarded a nine-month contract from the U.S. Army Corps of Engineers to evaluate the paleontological resources of two proposed reservoir sites in the northwestern Sacramento Valley, California, an area noted for its Cretaceous ammonites, a group of extinct shelled cephalopods. The field study will identify and evaluate affected areas and will make recommendations for mitigation or salvage. Dr. Peter Rodda is project director.

Department staff were deeply involved with exhibit development. Jean DeMouthe is in charge of the restructuring of Earth and Space Hall, which will provide exciting new displays relating to the galaxies, the solar system, Earth and the Moon, plate tectonics, volcanoes, and earthquakes. Dr.



Peter Rodda is curator of the planned Hall of Life Through Time, which will present an array of displays relating to the origin and evolution of life. The department staff also taught Docent, Adult Education, and Junior Academy courses, led field trips, and provided identifications and other services for the Academy, other institutions, and the public.

Dr. Daphne Fautin continued her research work on sea anemones, and she attended meetings at Chicago and at Friday Harbor, Washington. For most of the year Dr. Fautin was a visiting Professor of Biology at Beloit College, Wisconsin.

Dr. Michael T. Ghiselin continued his work on evolutionary biology and on Darwinism. He conducted field work in the Bahamas, Puerto Rico, and Baja California. Dr. Ghiselin delivered an invited paper at the meeting of the International Society for

the Study of Behavioural Development in Munich, Germany, and he taught a graduate course in evolutionary biology at the University of Puerto Rico.

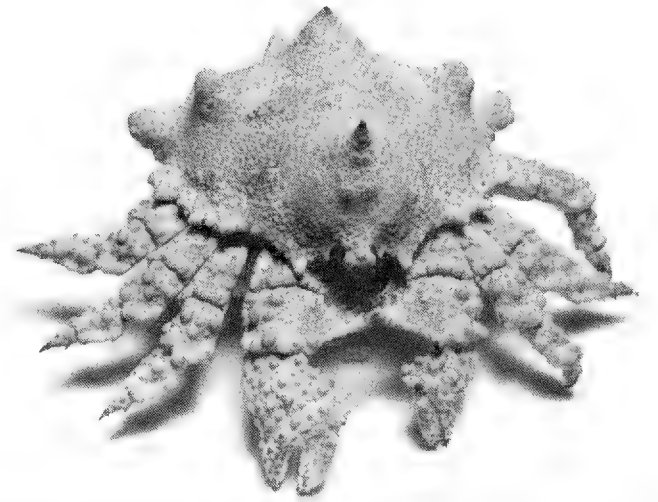
Dr. Terrence Gosliner completed a post-doctoral fellowship at the Smithsonian Institution, and he returned to the regular Academy staff. Dr. Gosliner continued his research on opisthobranch snails including field studies in Baja California, South Africa, and the Seychelles.

Dr. Welton Lee continued his research on California sponges, with special interest in the biochemical systematics of haplosclerid sponges. He conducted field work in central California and in Baja California, and he visited major sponge collections and sponge specialists in the United States and Canada.

Dr. Peter Rodda continued his study of Cretaceous and Neogene mollusks of northern California. He conducted field work in

the Cretaceous rocks of the northern Sacramento Valley with special emphasis on the stratigraphic and geographic distribution of the ammonite cephalopods.

Dr. Barry Roth continued his research on land mollusks of Western North America. He conducted field studies on the Channel Islands of southern California and in the Klamath Mountains in northern California.



ORNITHOLOGY AND MAMMALOLOGY

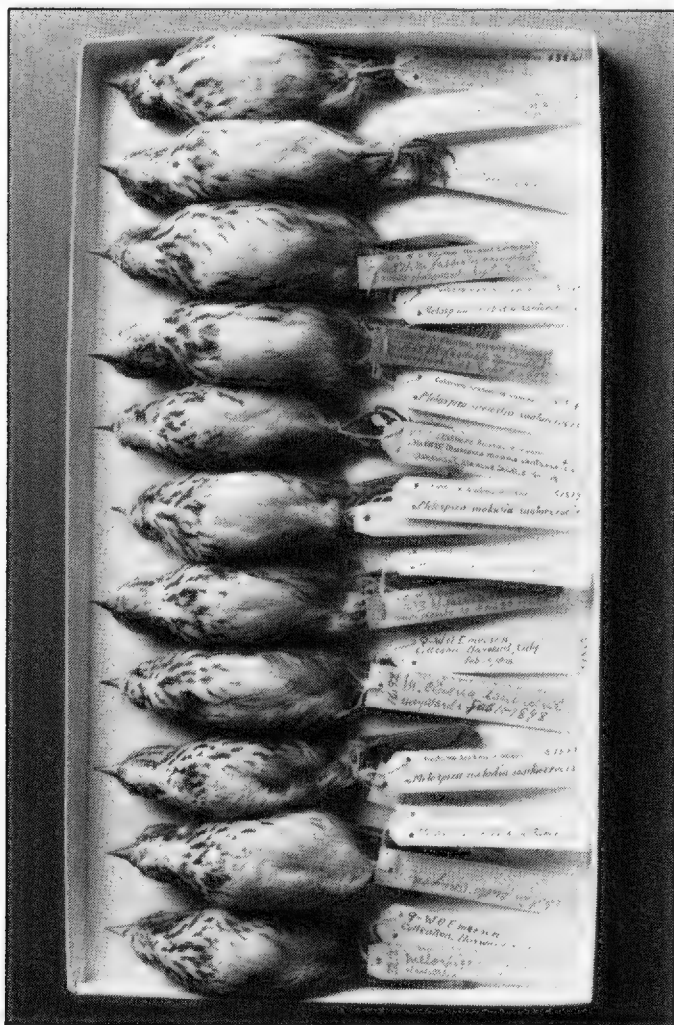
Luis F. Baptista, *Chairman and Associate Curator*

THE ORNITHOLOGY AND MAMMALOLOGY department was created in 1876 under the curatorship of Mr. F. Gruber, who, the previous year, had been appointed curator of ornithology. Shortly after the 1906 earthquake and fire had destroyed all the department holdings, the Academy's expedition to the Galapagos (1905–1906) returned with what was and still is one of the most comprehensive collections of Galapagos birds (8,718 specimens). At present the department holds 90,000 specimens of birds and 22,500 specimens of mammals, with strong representations from western North America, Mexico, South America (Galapagos), Manchuria, and East Africa. The highlight of the mammal holdings is the marine mammal collection, rated one

of the best in the country.

In 1983–84 a total of 581 birds and 126 mammals were acquired. Of these, forty-three were marine mammals (pinnipeds and cetaceans). A significant collection of Nearctic and Neotropical bird and mammal skeletons were received from Mr. Scott Cutler. Two generous financial contributions were received, one from Mr. Kenneth Walker, for the maintenance of the valuable African mammal collection he recently donated, and one from the Cousteau Society through the offices of the National Marine Fisheries Service, toward purchase of an industrial degreaser to prepare marine mammal skeletons.

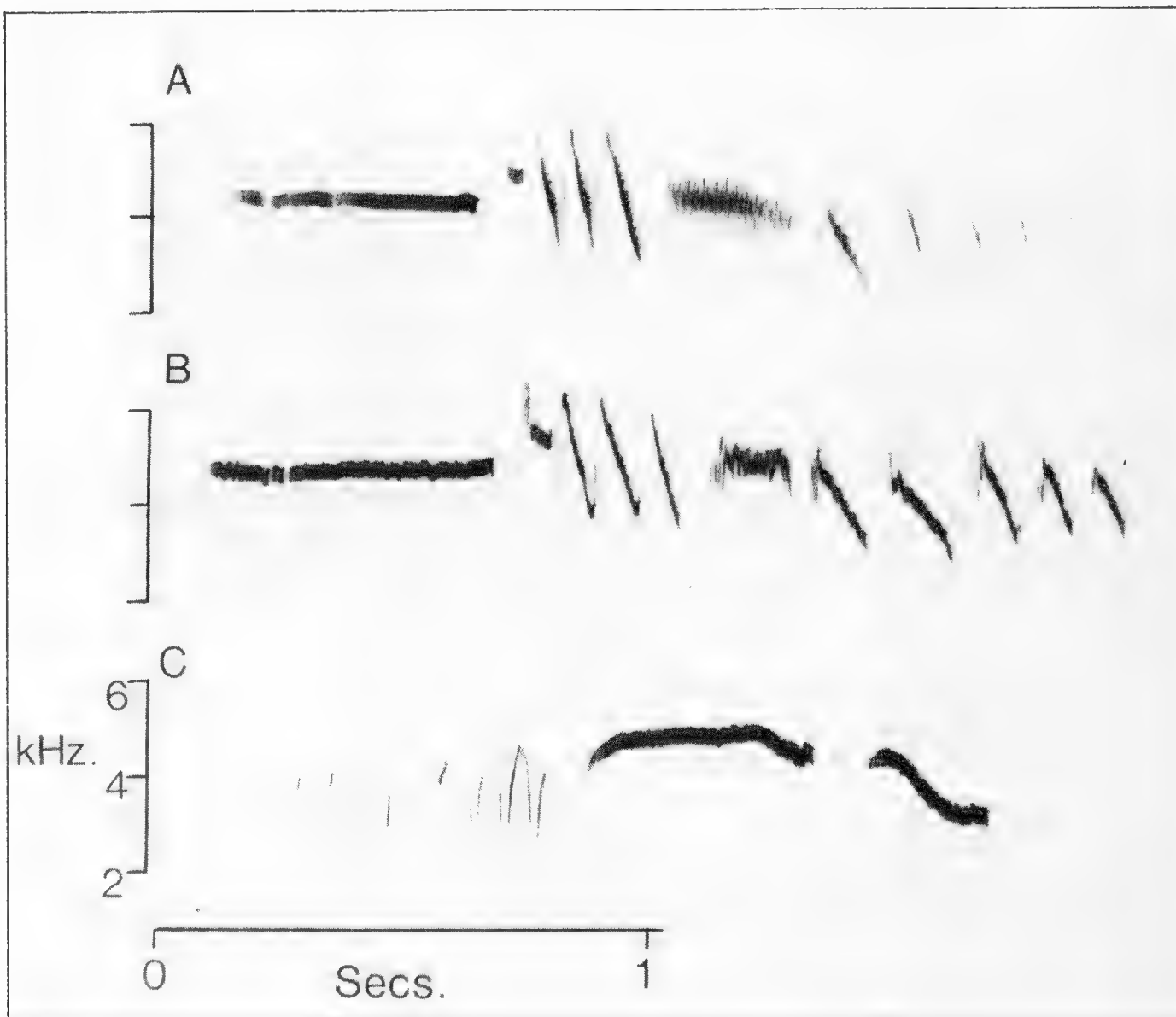
High humidity in the department fur vault required a major overhaul of the fa-



Top, this rock crab, a relative of the Alaskan king crab, is among the thousands of research specimens in the department of Invertebrate Zoology. [Photo by Lloyd Ullberg.]

Above, a series of song sparrow specimens and, right, a variety of birds' eggs—parts of the important systematic collections in the Ornithology and Mammalogy department.





cility. This was achieved with financial support of the Academy's administration, the expertise of the Operations and Engineers staff, who responded promptly to this serious emergency, and with the invaluable help of some dedicated volunteers.

Dr. Baptista initiated a grant proposal to the National Science Foundation to curate and computerize the bird collection, produced with the help of Jacqueline Schonewald and Sylvia Hope.

Dr. Baptista continued his research on dialects of white-crowned and black-chinned sparrows, in collaboration with Dr. Barbara DeWolfe (song ontogeny and territorial establishment), Dr. Lewis Petrino (song development in the white-crowned sparrow, funded by NIMH), and

Dr. Gope Menon (cutaneous water loss in desert birds). He lectured at the American ornithologist's Union Centennial in New York, at the Institute for Advanced Studies in the Behavioral Sciences in Palo Alto, at UC Davis, Humboldt State University, Los Angeles County Museum, and for the Academy docents. He also organized symposia on the evolution of flight in birds for the California Academy of Sciences Fellows' Day and on Bioacoustics for the AAAS annual meeting at San Francisco State University.

Senior Scientist Dr. Robert T. Orr pursued his activities as coordinator of the Docent course (four upper division units at S.F. State), led Academy tours to Scandinavia, the Amazon Basin, and southeastern United

States. He is Chairman of the Academy travel committee.

Betsey Cutler and Jacqueline Schonewald, assisted by Mary Marcussen and volunteer staff, continued their joint management of the collection. Mrs. Cutler participated actively in the proceedings of the AAAS meeting, where she presented the results of her study of syrinxes of oscine birds. The participation of Mrs. Schonewald in the establishment of new regulations limiting gill-net fisheries, in cooperation with other local organizations, led to the introduction of state legislation that offered hope of some reduction in marine bird and mammal casualties. She taught a class on marine mammals to the Academy docents.

The department would like to thank its faithful volunteers, without whom it could not function. In particular we recognize the contributions of George Swortfiguer, who after ten years of support is retiring.

Loans totalling 681 specimens in 78 transactions were sent out, including 423 birds, 242 mammals, plus eggs, nests, and tapes. The Junior Academy and Exhibits departments requested loans for educational purposes. Curatorial staff answered twenty-five domestic and eight foreign collection inquiries.

More than 670 visits were logged during the year, 22 visiting scientists logged 108 days; 17 graduate students, 94 days; 22 undergraduate students, 39 days; 7 government officers, 15 days; 22 artists, 29 days; 11 college groups brought 185 students; 104 other visits were for identification and loans.



Above, sonographs of white-crowned sparrow songs recorded and analyzed by Curator Luis Baptista. Graph "A" shows the song of a sparrow from Oregon; graph "B," the song of a California sparrow that learned the Oregon dialect from bird "A"; and graph "C," the song of an isolated captive sparrow that did not learn any special dialect.

Left, a white-crowned sparrow chick being fed in the department's experimental colony. [Photo by Luis Baptista.]

SCIENTIFIC PUBLICATIONS

Sheridan Warrick, *Editor*

WITHIN A YEAR of the Academy's founding in 1853, the institution had begun to publish in a San Francisco newspaper notes on the facts and findings presented at its meetings. By the 1860s these "proceedings" had taken a more formal and individual identity and were being printed separately as volumes of scientific papers. This series of scholarly volumes has been in continuous publication to this day.

During the year, the Academy's Scientific Publications program continued to change and grow. Sheridan Warrick assumed full editorship of the *Proceedings* and *Occasional Papers*, and Mary Stilwell was hired as publications assistant to help with practical details of getting out the papers. The pub-

lications committee and its procedures were also streamlined to speed the review and processing of manuscripts received for publication.

Members of the Scientific Publications committee were Frank Almeda, Daphne G. Fautin, Tomio Iwamoto, Frank H. Talbot and Sheridan Warrick. Lillian J. Dempster served as *Proceedings* indexer.

Since the last annual report 6 issues of *Proceedings* and 4 volumes of the *Occasional Papers* had been published, totaling 321 pages.

Academy publications are mailed to 825 individuals and institutions in the United States and abroad.

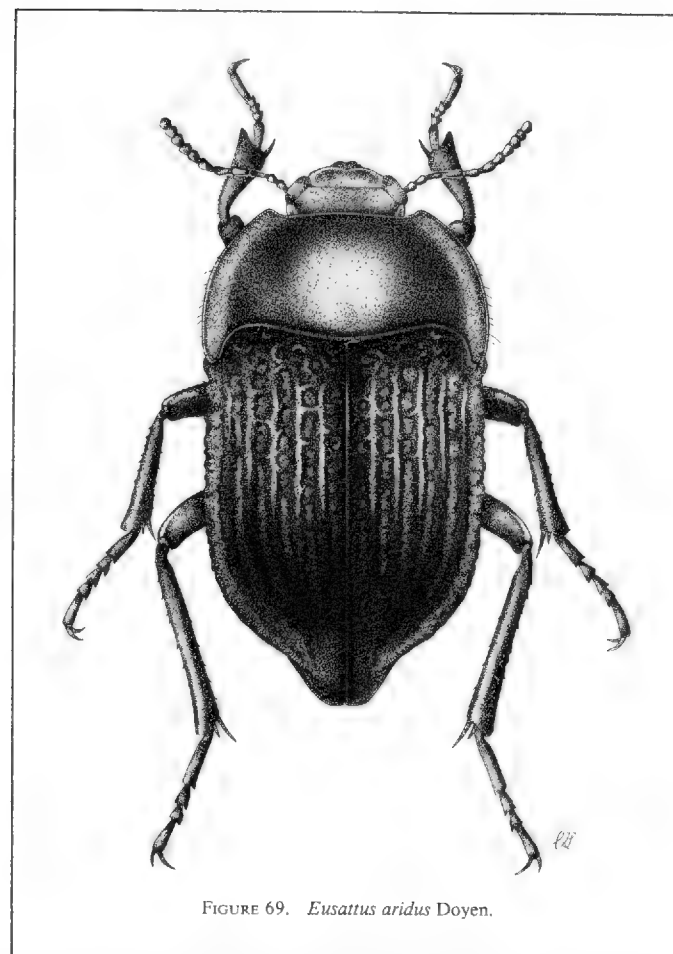


FIGURE 69. *Eusattus aridus* Doyen.

LIBRARY

Ray Brian, *Librarian*

THE FIRST Academy Constitution of 1860 speaks of "the collection of a cabinet of specimens, and a library of the standard and current works on Natural History. . . ." Early establishment of exchanges through the Smithsonian International Exchange Service laid the foundation for the research strength as our *Proceedings* were sent out and in return the learned journals of other societies began to come in. Already in 1889 a catalog of holdings ran to 114 pages. The generosity of sister institutions and friends insured the prompt re-founding of the library after 1906. Important collections were acquired by purchase as money became available, an activity accelerating after World War I. Gifts and bequests provided important additions. In 1958 the first

building specifically designed for library use was occupied, and soon thereafter special quarters were set up for maps and rare books. Special training or advanced education became required for library workers. At present, with 90,000 volumes and a new terminal providing modern information access, the library provides significant quality service in support of Academy research.

The year 1983-84 was one of intensive planning. We began implementing the plan this year and started off with our new computer terminal. This has permitted us to access a multimillion-volume bibliographic database and to produce our catalog records by a new, cheaper, faster technology. This has been a year of initiation as we explored new machine capabilities—and the new frustrations that go along with down time.

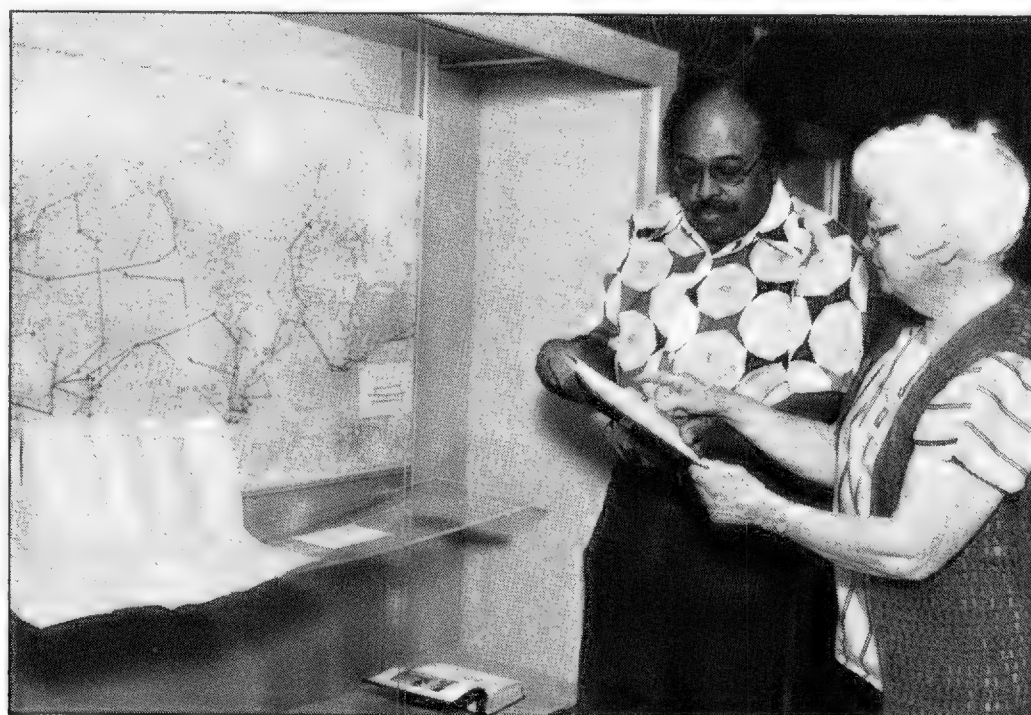
The second focus of activities has been book shifting and reorganizing as we cleared half of the mezzanine in preparation for the move of Picture Collection into the

library. By the end of the year we had almost completed the shifting. As a byproduct, more than \$15,000 was raised in the sale of duplicate and out-of-field books, funds that might be necessary to use to fund the first microcomputer for the Library.

Meanwhile the Library has continued its basic role of service providing research staff with books, journals, interlibrary loans, and computer-retrieved information. The budget increase granted this year enabled us to support old as well as new departmental book, journal, and binding needs. This was augmented by special Skaggs Fund money, part of a two-year grant. Inter-library loan activity more than doubled. Reclassification continued despite the new pressures; in fact, the increased bibliographic pool size and ease of access has facilitated the reclassification effort. The special effort to shift materials and dispose of out-of-field and duplicate materials resulted in the sale of many duplicates to the Western History Research Center at Laramie, Wyoming. An additional special project completed this year was the shifting of rare book materials into a more coherent arrangement with a concomitant push to catalog a backlog. Finally, we featured Great Explorers and CAS Expeditions as the theme for displaying rare books at the annual Open House, which produced a record turnout.

Above, a new species of beetle described in an Academy Occasional Paper by Fellow John T. Doyen.

Right, Assistant Librarian James Jackson and Library Assistant Doris Cantou confer over a display in the Maillard Library.



ADMINISTRATION

Nancy B. Dykes, *Director of Administration*

THIS SECTION HIGHLIGHTS the history and activities of the Academy's administrative support staff. These hard-working men and women are the invisible and unsung folks who make the Academy function smoothly each day; the guards who secure life and property; the custodians who keep the complex clean and enjoyable; the admissions personnel who greet our 1.7 million visitors; the office staff that pays the bills, answers the phone, delivers the mail and provide service to our 250 employees; and the operations staff that provides exhibits and offices with cabinetry, fixes microscopes, keeps our exhibits audio-visual equipment running, and provides technical support for all capital and construction projects. The Academy could not open in the morning or close in the evening without the help of each person in these departments. They are dedicated to the Academy and to the public service we provide.

A special and personal thanks to department chairmen Frank DeOme, Jane Yau, Joni Hall, and Bob Bergor who make my job easier and more enjoyable. Warm thanks, too, to Gene Shurtleff for his patience and leadership as chairman of the Finance Committee.

BUSINESS OFFICE

Jane Yau, *Controller*

THE EARLIEST available audited statements of the Academy are for the year ended 31 December 1913. They reflect a single-fund operation, listing Academy assets at \$1.3 million, including \$1.1 million in real estate and construction. At that time income was derived mainly from endowments, followed by membership dues and individual gifts for various purposes. Those were the days when all records were the responsibility of a single accountant. Even as late as 1966 the Business Office was headed by a single accountant assisted by a staff of four: an assistant bookkeeper, a stenographer, a PBX receptionist, and a membership secretary (part-time).

The dynamic growth experienced by the Academy within the past decade can be evidenced in the \$18 million total assets now held in the four operating and restricted

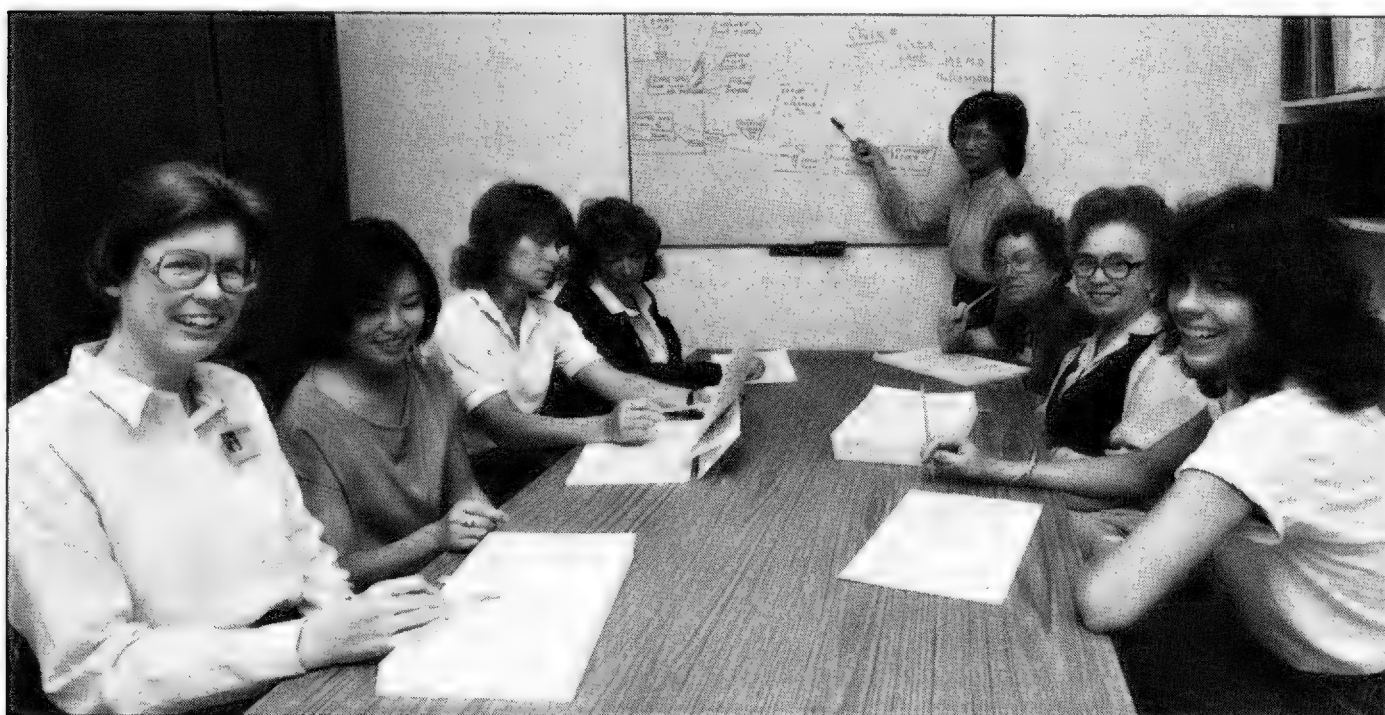
funds, including \$2 million in booked real estate. The office staff now numbers ten individuals, whose responsibilities represent four distinct functions: financial management, accounts payable and receivable, office services, and switchboard and reception.

The positions of JoAnne Deasey, switchboard receptionist, and Judith Bows, office services coordinator, reached full-time status long ago. Still, the volume of calls and mail continues to grow, and JoAnne and Judith have adapted admirably within the physical constraints. Emily Date, account clerk, generously adapted her hours within her part-time position to serve the Academy employees' check-cashing needs, in addition to a multitude of other cash and admission functions.

During the past year the accounting staff

continued to feel the impact of the greatest change since the inception of the Business Office: the conversion from a totally hand-posted accounting system to a computer service bureau-assisted batch-processing system. Dawn Davis, Chief Accountant, proceeded to improve the computerized reporting by introducing more timely and easier-to-comprehend departmental reports, in addition to continuing to oversee the proper flow of data throughout the computer system. Freda Sherman, bookkeeper, Kim Dodd, Suzanne Gray, and Carolyn Balsley, account clerks, continued in their enthusiastic efforts to master the art of a computerized accounts-payable system, while Alice Chu, bookkeeper, sought better ways to input her cash receipts data to enhance the usefulness of the detailed general ledger. During the year the acquisition of an IBM personal computer provided Jane Yau, Controller, with a new horizon for further revamping and streamlining the accounting system, as well as designing supplementary reports and implementing special projects. As the accounting hardware changes, the Business Office continues a process of critical self-evaluation to ensure that job responsibilities and internal controls evolve to maintain maximum efficiency and compatibility within the accounting system.

Acknowledgment is made of the time contributed by Tina Ahn (despite her ever-expanding responsibilities as Admissions Supervisor); by Irmgard Gates, Linda Larabee and Shelley Moser for their switchboard relief efforts; and by Micah Nothenberg for her assistance in the mailroom.



Business office staff members (left to right) Carolyn Balsley, Tina Ahn, Kim Dodd, Dawn Davis, Jane Yau, Emily Date, Freda Sherman, and Micah Nothenberg, meet to discuss computerization of the Academy's business procedures.

PERSONNEL

Joan S. Hall, *Senior Personnel Assistant*

PERSONNEL is a new department this year—a response to the growth of paid staff to the present two-hundred-seventy employees, the accompanying expansion of benefit programs, and an increase in legal and governmental requirements. Previously, these responsibilities fell to the Director of Administration.

This has been a busy year, as usual, beginning with the implementation of the updated salary and wage program in July and the complete changeover of our primary health insurance carrier following an extraordinary rate increase and continuing

through the present reevaluation of the salary program. Over the course of a year, personnel processed over three-hundred-fifty employees representing a payroll in excess of \$3 million and coordinated the benefit programs for the one-hundred-fifty eligible employees at the Academy. Benefits now include extended disability insurance, retirement plan, medical, dental, life insurances, vacation and sick leave, thirteen paid holidays per year and the services of an outside credit union. Counseling employees on personnel matters and problems, orientation of new employees, responding to job applica-

tions, and keeping current on laws relating to personnel round out the responsibilities of the department.

Additional special projects begun during the year included serving as secretary to the Director's Staff Discussion Group, beginning the revision of the Academy telephone directory, training for the new payroll system being instituted for city and county employees, and assisting with the revision of the Academy employee handbook.

Payroll continues to be a function of the department, becoming more and more secondary to the personnel requirements.

ADMISSIONS

Tina M. Ahn,
Admissions Supervisor

THE BOARD OF SUPERVISORS for the city and county of San Francisco approved adoption of an admission fee to the museum and aquarium on 1 July 1970. This policy eased the financial burden of increased operating costs as our facilities expanded. Upon implementation of the new fee, the Admissions department became responsible for the single largest revenue source for the museum.

The responsibilities of the Admissions staff are to report accurately daily income from admission fees and to answer questions concerning current exhibits and Planetarium show times from the public. In 1983–84 these responsibilities were fulfilled by an excellent staff of twenty-eight cashiers and ticket takers.

The Admissions staff welcomed 1,469,741 visitors, an increase of 11 percent from the previous year. Income from admission fees also increased 11 percent (there was no increase in admission fees this fiscal year). Adult attendance increased 10.5 percent, youth and senior attendance increased 13 percent and child attendance increased 14 percent. Non-paid attendance, which includes members and their guests as well as children under six years of age and San Francisco school groups, increased by 11 percent.

PUBLIC INFORMATION OFFICE

Pam Wing, *Public Information Officer*

THE RESPONSIBILITY of the Public Information Office is to get the word out to media and interested publics about the activities of the natural history museum and aquarium, whether they are of a public or scientific nature.

The past year presented many opportunities with exhibits such as "The Art of Robert Bateman," Galen Rowell's photography exhibition, "Mountain Light," and "Andy Warhol: Endangered Species."

A major magazine story in *California Magazine* on the museum's search for the great white shark, led to two appearances by Aquarium Director John McCosker on Johnny Carson's "Tonight Show." A cover story on the May 1984 issue of *San Francisco Business Magazine* told of cooperation between the Academy and local corporations.

The scientific activities of the California Academy of Sciences were reported on the museum's daily radio program "Science In Action," produced by Jerry Kay. The program is now heard by audiences in San Francisco, Los Angeles, Sacramento, and Portland, Oregon.

A visitor survey was completed and tabulated and as a result a total redesign of the museum's logo was undertaken through the Public Information Office. The legal name

"The California Academy of Sciences" has been enhanced with the description "Natural History Museum and Aquarium." A new visitor brochure was designed and distributed to attract tourists to the museum complex, and distribution of various posters, brochures and press releases continued throughout the year. The office also produces the monthly members *Newsletter*.

Exhibit openings and special events were successfully coordinated by Deidre Kernan, and photographs, invaluable to the office, were taken throughout the year by Susan Middleton.





PICTURE COLLECTION

Johan Kooy, *Chairman*

THE PICTURE COLLECTION was founded in 1962 under the administration of Director Robert C. Miller with Johan Kooy as chairman. The collection, which presently contains over a million images, filled a long-anticipated need as attested to by its rapidly increased growth and use during Dr. George Lindsay's years as Director. Actually the beginnings of the Picture Collection reach back in time to the 19th and early 20th centuries when thousands of historical photographs and art works were generated by skilled photographers and artists. These included rare images of very early Academy expeditions, buildings and staff, as well as plants and animals.

Much time during the past year has been spent accessioning many of the vast numbers of fine natural history slides waiting to be entered into the collection. These are primarily gifts from nature photographers received within the past three years.

Conversely, in anticipation of relocation into new quarters in the mezzanine of the Academy library, significant reduction of the collection has been in process by the carefully considered removal of less desirable material from the department's files.

Supplying many visual materials for Academy Exhibits, slide shows, lectures, publications and design projects, holdings must be extremely diverse to satisfy equally diverse requests for pictorial materials. The enthusiasm of the collection's users for its wide-ranging scope buoys the efforts of Staff and Volunteers to gather, accession, file and retrieve needed pictures. The Picture Collection Volunteers, 17 in number, are responsible for much of the progress in processing collections and in giving assistance to the department's many clients.

Facing page, Public Information Officer Pam Wing and, left, Pacific Discovery Editor Sheridan Warrick.

Above, a photograph reproduced from the thousands of historically important glass and film negatives of the 1905-06 Academy Galápagos Expedition now held in the Museum's Picture Collection [Photographer unknown.]

PACIFIC DISCOVERY

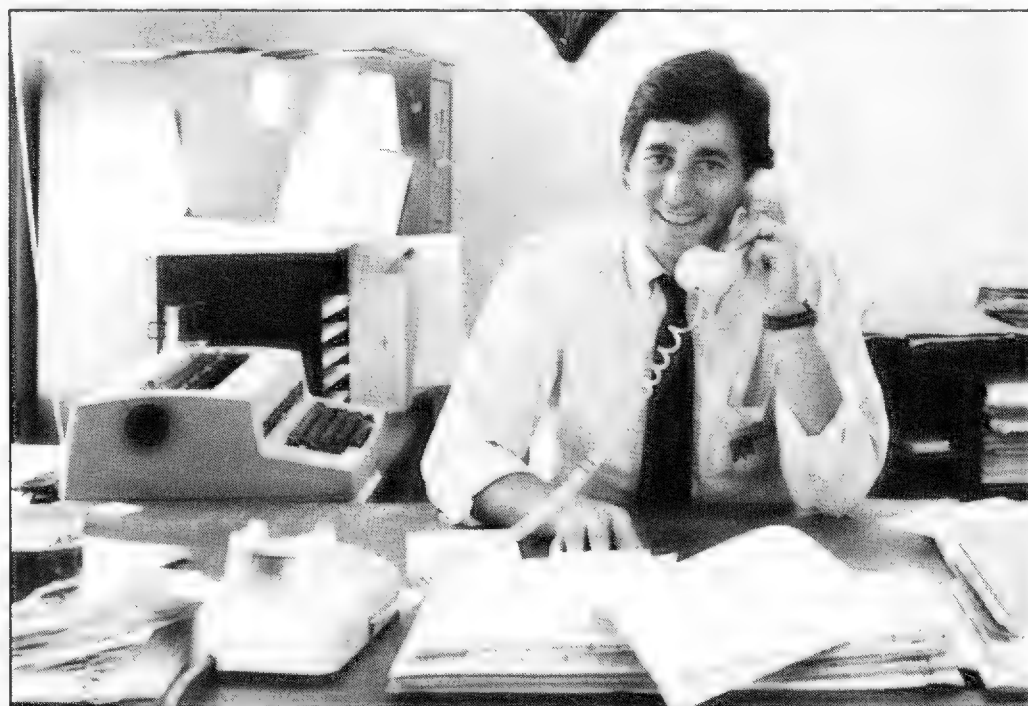
Sheridan Warrick, *Editor*

THE ACADEMY'S MAGAZINE began publication in January 1948 with Director Robert C. Miller as managing editor and Don Greame Kelley as editor and art director. Dr. Robert Orr, then as now, served as a member of the magazine's editorial board. The editorial policy defined in 1948 by Dr. Miller remains the same today: "Our primary concern is to meet the need . . . for a magazine placing its emphasis on the natural history of the Pacific Coast and the Pacific Basin. . . . High among our aims is to urge the intelligent conservation of natural resources and natural beauty."

This year the magazine published more than twenty-five articles on behavior, ecology, evolution, human origins, and astronomy, among other topics. Throughout the

year, magazine staff continued to strengthen contacts with outstanding researchers, writers, and photographers to bring increasingly competent views of discoveries in the Pacific region to the museum's membership. Also, a new regular column was added: Counterpoints in Science, a thought-provoking essay by University of California researcher Jerold M. Lowenstein. His views of molecular biology and human evolution have given a new depth and breadth to the magazine's science coverage.

Associate editors are Robert I. Bowman, John E. McCosker, and Robert T. Orr. Frank Talbot is Publisher. Johan Kooy is Art Director and Bill Prochnow, Design Consultant.



OPERATIONS

Frank DeOme, *Operations Manager*

IN THE EARLY 1960s the Operations department was managed by the building superintendent, who was also the Instrument Shop supervisor. The Academy was much smaller then, with only 50 employees and fewer departments to maintain. Since that time, with the growth of the Academy, the role of Operations has increased. All aspects of the museum, including scientific and public display, rely on Operations for plant services, technical design, engineering and implementation, as well as repair of equipment, installation and fabrication of new equipment, minor renovations, remodeling, and major new construction. The Instrument and Cabinet Shops, Security, Custodial and Print Shop departments all fall under the jurisdiction of Operations.

This year, in addition to overseeing the management of the subsidiary departments, Operations staff also participated and contributed to many Academy projects. In mid-year, the position of assistant operations manager was created and Nate Cole was promoted from custodial supervisor to fill the position. Nate brings a greater depth of main floor activities experience to Operations. Gill Fuller serves as our building electrician and exhibit lighting specialist. This year Gill has been involved in the Earth and Space Hall renovation, where he is planning and installing the hall and ex-

hibit case lighting. He upgraded the feeder service to bring more electrical capacity of the hall itself. Lonner Holden is our building maintenance technician for both the Academy and its commercial building downtown. This is a tremendous job as it entails keeping the building in good repair from roof to basement. Lonner was responsible for the seismic anchoring of shelving in Invertebrates and Zoology and the badly needed overhauling of all mechanical functions on the Morrison Planetarium doors.

Roberto Ayala works as a building painter and spends most of his time painting in the Aquarium. This year he has been assisted on an hourly basis by Gregg Scharf, who has helped with repainting of offices, hallways, and background and wall color changes for exhibit installation. Jeff Kohl was hired on an hourly basis to recondition ticket machines and reprogram the cash registers for admissions. He also repaired and maintained slide projectors and helped to gather and sort over 2,000 sheets of building blueprints from many city departments; these will be photographed on microfilm.

Operations was also involved in the supervision of the remodeling of the Trustees' kitchen, numerous carpeting installations throughout the Academy, installation of Xenon projectors in the Auditorium, and renovation of office space for Geology and the fur vault, with the help of the Aquarium engineers. An additional laboratory was added in Herpetology by Arthur Rostoker, an hourly employee.

Rick Kerrer is volunteering his time and electrical engineering experience. He has helped us review the electrical billing method, the capacity of the main electrical switch board, and the method for installing emergency generators in the aquarium.



INSTRUMENT SHOP

Cary Ponchione, *Supervisor*

The Instrument Shop originated during World War II when part of North American Hall was closed to the public so that an optical shop could be set up to assist the navy in the repair of telescopes and ships' instruments. Many skilled volunteers, most of whom were women whose husbands were in the service, were trained at the Academy to do painstaking optical work. After the war, the Academy wanted to build a planetarium, but instruments and lenses were difficult to obtain. The Instrument Shop expanded its facility, and over the next four years its skilled technicians constructed the sophisticated planetarium projector that is in use today. Since then, it has further expanded to include construction of Foucault pendulums and other exhibit and scientific equipment.

This year the Instrument Shop completed several projects. Cary Ponchione and Larry Klingenberg constructed the animal sound and special lighting effects for the African water hole diorama. Mechanical design, construction and installation of the planets in the new Earth and Space Hall was a joint effort by Cary Ponchione of the Instrument Shop and Phil Fraley and Linda Granke-Kulik of Exhibits. The Aquarium's "Stop the Drop" exhibit was designed and built by Allan Wilson, with Eric Johnson and Steve Katzman of the Cabinet Shop.

Special recording devices for Ornithology and Mammalogy and a timing device for the electron microscope were made by Larry Klingenberg. Our volunteer, Wally Wallenberg, serviced and maintained tape recorders and installed public address systems in Geology and Botany. Herb Hoover, volunteer, has repaired chairs and equipment for

Left, in the Academy's Instrument Shop, Technician Tom Henry adjusts a delicate dissecting microscope used by one of the research departments.

Facing page, Printer Bob Dueball prepares the Academy's printing press for a run of business cards and letterhead.

the Academy, and microscope repair work is volunteered by Tom Henry. Much of the extra time for the technicians to complete these projects was made possible by the secretarial position added this year. Pat DeOme and Eileen Protz split this position, which entails some 500 annual purchase orders, covering phones, filing catalogs, and delegating jobs to appropriate persons.

CABINET SHOP

Eric Johnsen, *Supervisor*

The need for an in-house cabinet shop arose with the construction of Science Hall in 1949–50. Originally a one-man operation attached to the Exhibits department, it grew out of a need for permanent displays. It continued to grow with the needs of the scientific departments, and management was shifted to Operations. The completion of Wattis Hall in 1977 found the staff expanded to four full-time and five part-time employees. In 1980 the design and construction of "Hopi Kachina: Spirit of Life" and "The Deep Frontier" in 1981 proved the capabilities of the Cabinet Shop staff to produce temporary traveling shows on a large scale.

In the past year, the shop has assisted in the design and construction of two county fair booths, light boxes for the African water hole, "Stop the Drop," "Mountain Light," and the Robert Bateman exhibits. It has participated in projects for Anthropology, Membership, Birds and Mammals, the Planetarium, the executive offices, and Exhibits. The past five months have been occupied with the design and renovation of Science Hall in its transformation to Earth and Space Hall.

PRINT SHOP

Frank DeOme, *Operations Manager*

The Academy's print shop was originally started in the early 1950s as part of the Instrument Shop's efforts to have in-house printing of scientific publications and staff-use printed materials. Currently, Bob Dueball, under the supervision of Steve Craig, ably runs the operation which has seen considerable upgrading this past year. A multi-lith press that had been idle for many years was upgraded with the addition of a chain delivery mechanism and a two-color head. This "new" press, along with our existing press, has enabled the shop to more than double its output. We are currently printing well over a million impressions per year. Stella Tatro, our binder, does most of the folding, stapling, and trimming.

CUSTODIAL

Daniel Langlands, *Maintenance Supervisor*

In 1960 when the Academy of Sciences consisted of North American Hall, African Hall, Bird Hall and the Aquarium, the building was maintained by two city custodians. As time went on and the Academy grew, so did the custodial staff. By 1976, an additional fourteen custodians were added: seven city employees and seven were CETA employees. In that year a major change was made and three of the city custodians were hired to maintain the buildings during the day. An outside maintenance contractor was employed to relieve the city custodial workers in the evenings.

It is now the responsibility of the custodial staff to keep the public and department areas of the Academy clean. The public areas are open to visitors every day of the year, requiring daily custodial service. Mr. Daniel Langlands, who was promoted this year to Custodial Supervisor, along with his three assistants, Rosa Ortiz, Antonio Bertalazzi, and James Treat, the

relief custodian, fulfill these duties.

The custodians also assist in moving furniture and equipment, rearranging classrooms and conference rooms and off-loading shipments and deliveries that arrive at the loading dock.

In addition, Pedus, a private maintenance company, performs a major cleaning every evening both in public and department areas. Special cleaning functions are performed in the evenings and Mr. Langlands supervises this operation in coordination with the evening crew. Academy staff custodians are now present as often as three evenings per week.

SECURITY

Levelle Alderson, *Head Guard*

In 1960 security at the Academy of Sciences consisted of two guards in a building that was much smaller than it is today. In 1970, for the first time, admission was charged and an additional four guards were hired. By 1971 the Academy had four guards, two city guards, and ten guard trainees. The Academy now has nine permanent guards and six hourly guards maintaining a secure building twenty-four hours a day year-round. Also, during the summer extra guards are hired for evening open hours; and extra guards are hired when needed for special occasions.

Levelle Alderson, Head Guard, is responsible for the scheduling of all the guards. The security personnel provide for the safety of visitors, staff, and property. Special exhibits containing valuable art work, artifacts and treasures also require monitoring of surveillance equipment and alarm systems. The guards give information to the public, register school groups, and help locate lost people in the building.



PEPPERWOOD RANCH NATURAL PRESERVE

George Lindsay, *Director Emeritus of the California Academy of Sciences and Director of Pepperwood Ranch Natural Preserve*

PEPPERWOOD is a 3,100-acre ranch in Sonoma County that the Academy received from Mr. and Mrs. Kenneth Bechtel's Belvedere Scientific Fund in 1979, for the purpose of preserving the natural and biologically significant area in perpetuity.

During the year resource management specialist Betsy Jewett studied the preserve and presented an evaluation and preliminary plan for its protection, utilization, and management.

An annotated list of Pepperwood's more than 620 species of vascular plants and a description of its several plant communities was completed by botanist Greg de Nevers.

"Pepperwood in Bloom," an exhibition of fine wildflower photographs by Jo-Ann Ordano, was prepared for presentation in Cowell Hall in the fall of 1984. Miss Ordano made the photographs in 1982 and 1983, which were exceptional wildflower seasons.

Educational uses of Pepperwood included botanical and geological day tours for adults and field trips and camps for Junior Academy members. The facility was used for field classes by Sonoma State University and other institutions, as well as natural history clubs and organizations.

The feasibility of establishing a modest astronomical observatory on the preserve was investigated and a plan was approved. It will be located in the southern section of the ranch adjacent to a proposed interpretive center, where utilities are available. The observatory and interpretive center will not intrude into sensitive areas of the preserve. The Academy's taxidermy studio and facilities are already located there.

Substantial support for Pepperwood Ranch Natural Preserve was received from Mr. and Mrs. Robert D. Ogg, Mr. and Mrs. Thomas Tilton gave a four-wheel-drive field vehicle, and a grant for the construction of the observatory was made by Mr. and Mrs. William J. Hume, for which grateful appreciation is expressed.



The Academy's Pepperwood Ranch ecological preserve in Sonoma County. [Photos by Lloyd Ullberg.]



DEVELOPMENT AND MEMBERSHIP

Charles B. Raaberg, *Director of Development*

HISTORICALLY, the Development office was established in 1968 for the "long-range development and financing of the Academy, and for the continuing programs for corporate, foundation and individual support"—goals that remain the same today. Also, during that year, a new affiliate group, the "Friends of the Academy," was organized under the chairmanship of Trustee John A. Sutro. Members of this newly formed group individually gave at least \$1,000 a year. In 1983, those who gave \$5,000 or more were elevated to a new donor category called the Trustees' Circle. Individuals who have given a cumulative total of \$50,000 or more are honored as Benefactors, and members of this group date back to James Lick in 1876.

DEVELOPMENT

Charles B. Raaberg, *Director of Development*

THE YEAR 1983-84 has been marked by several organizational changes in the Development department. In addition to the Membership office, the Travel and Special Programs' office now reports to the director of Development. Mr. Brett LaMott joined the Development staff to promote corporate support. To a person, the staff has grown in job knowledge and professionalism.

Last year housekeeping details and organizational matters consumed much time and effort. With that behind us, we were able to get on with the work of expanding the Academy's base of support. Expand we did; over all (exclusive of membership) Development accounted for \$1,071,354, a significant year indeed. Gifts by amount were up 40 percent over last year; the biggest increase was in the corporate area, which was up 95 percent.

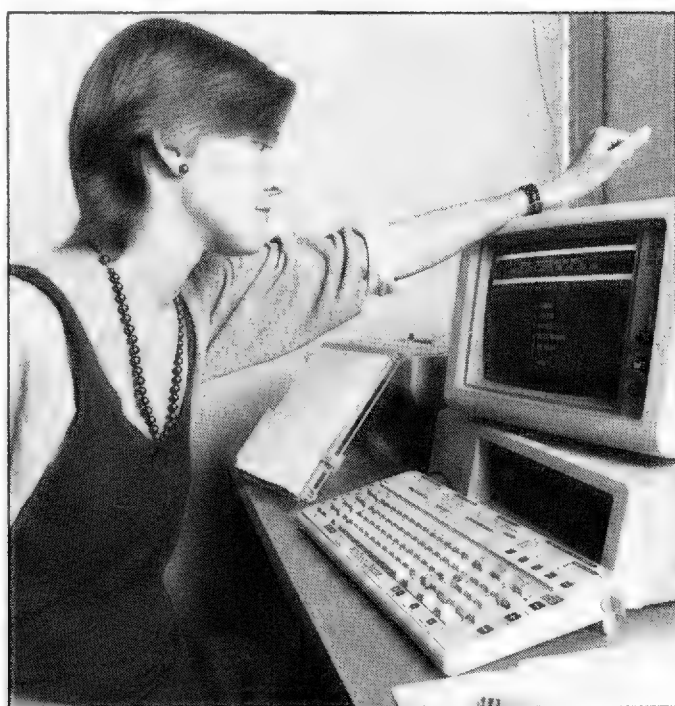
The Academy is especially fortunate to have such generous friends. They are generous in spirit as well as dollars, and the good feelings that arise from their support spur

even more good happenings. The future of philanthropy at the Academy is bright.

Behind this year's success is able leadership. All Trustees have been helpful, but uncommonly so have been Mr. Jeffrey Meyer, Mr. William J. Hume, Mrs. Robert Dunne, and Mrs. Roy A. Borgonovo. Special thanks is also proffered to the Academy staff, especially the scientific staff who are always ready to help.

In addition, a new leadership committee was formed—the Friends Committee. This group, which is charged with helping the Academy build the top levels of the annual donor base, is co-chaired by Mrs. Dunne and Mr. Hume. Initial members include Mr. Lyman Casey, Mr. Allen Cooper, Mrs. Edith Dant, Mr. Lawrence W. Feldman, Mr. Lester C. Gunther, Jr., Mr. and Mrs. Phillip Lamoreaux, Mrs. Lois Lippincott, Mrs. Douglas Moore, and Mrs. Richard Peterson.

Lists of major donors appear by category on pages 38 through 40.



Left, at the Development office's computer, Administrative Assistant Maribeth Riggs prepares for an analysis of membership statistics.



Right, Membership Coordinator Alice Franco at her desk.

MEMBERSHIP

**Alice H. Franco,
*Membership Coordinator***

THE ACADEMY has been a membership organization from its beginnings in 1853. It is written in the Academy's constitution that "scientific gentlemen may be received as resident members." Within a few months of the Academy's founding, the "scientific gentlemen" decided that they "highly approve of the aid of females in every department of natural history," and they began to admit women as members. Interestingly, to become a member in 1853, one had to pay an initial fee of \$10 and dues of \$2 a month thereafter. Membership was actually more costly at that time than it is today.

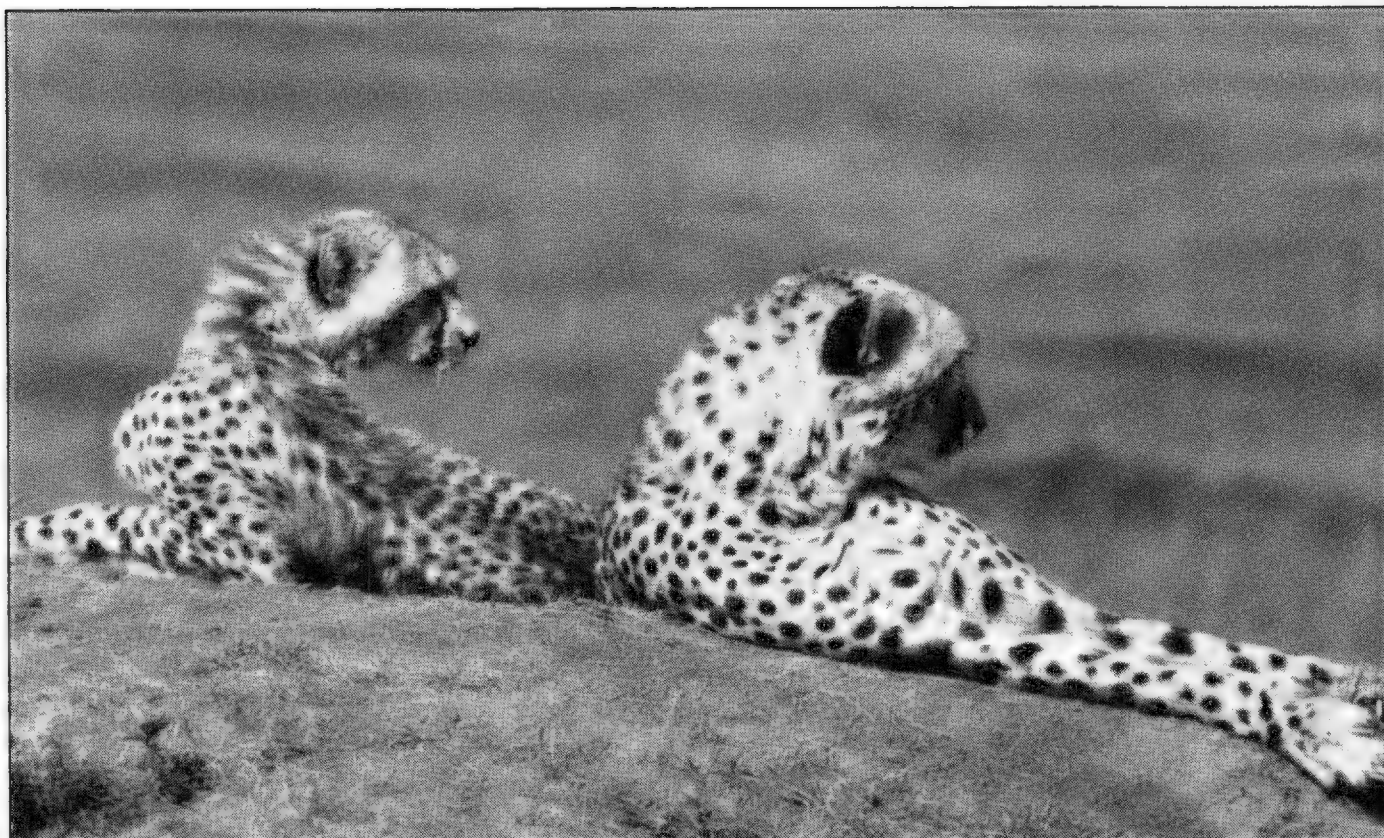
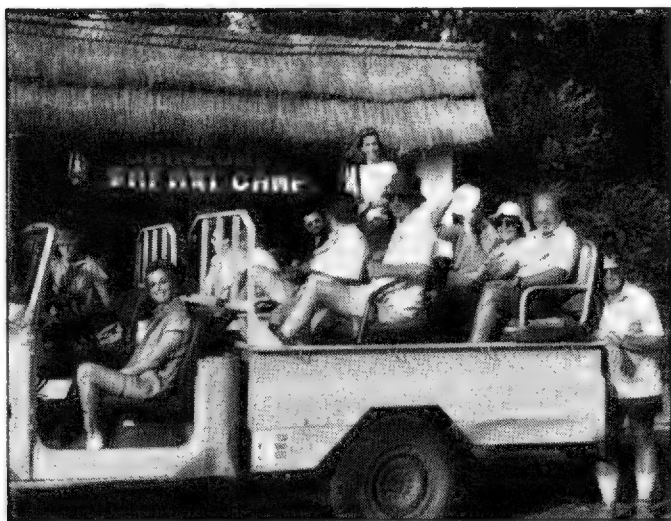
The Academy's membership has now grown to a total of 20,389 members. This represents a 17 percent increase over last year. Income from membership was \$448,314, with an additional \$61,470 income from our membership campaign. In addition, two added gift appeals were sent to members resulting in over \$67,959 for repair of the Aquarium's dolphin tank and for special exhibits. The Academy's members continue to provide important support and a vital link with the Bay Area community.

SPECIAL PROGRAMS AND TRAVEL

Sandra Lelich, *Coordinator*

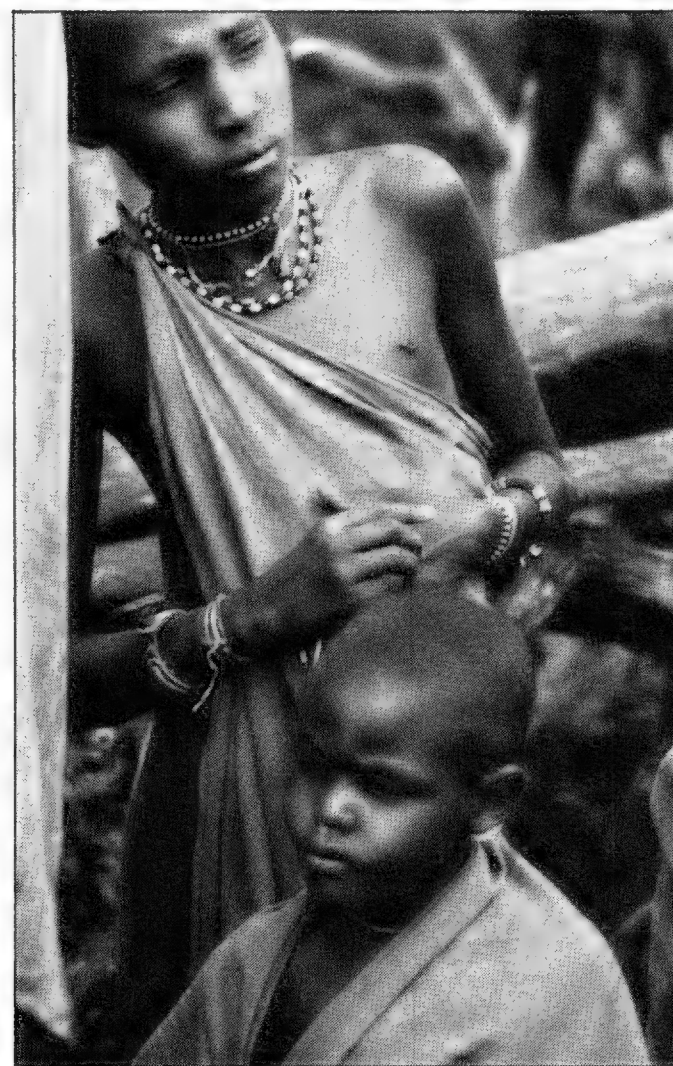
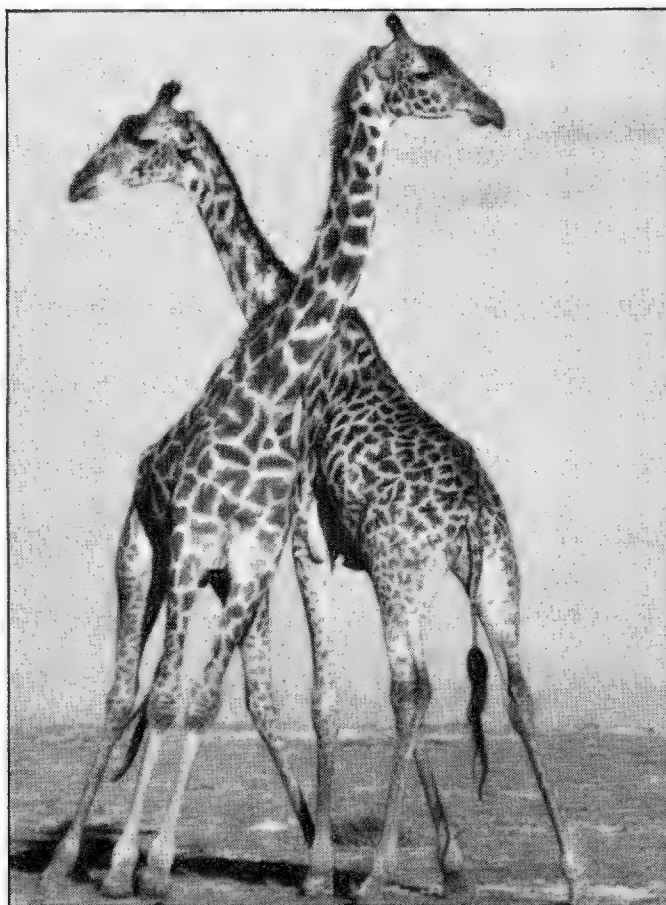
NUMEROUS FILMS, lectures, symposia and special events have highlighted the past year. Several programs were planned in conjunction with temporary exhibits. For example, a weekend of mountaineering programs, featuring backpacking equipment displays, films, fashion show, and orienteering and rappelling demonstrations highlighted the opening of the Galen Rowell photo show, "Mountain Light." Special dance performances and lectures were planned with the exhibit, "Crossroads of the Ancient World: Israel's Ancient Heritage." And, for the holiday season, "Christmas Trees Around the World," an array of trees decorated by various ethnic communities in the Bay Area, graced the Cowell Hall entrance to the museum.

Special lectures, film premieres, and symposia covered a wide range of topics in the realm of natural history. The annual Claire Matzger Lilienthal Distinguished Lecture, "The Star-Seekers: Astrophysicists Explore the Universe," was presented by Dr. Rochus Vogt, Provost, California In-



stitute of Technology. Other lecture presentations this year included "Mountain Gorilla: Gentle Giants of the Forest," by Dr. Dian Fossey, "Among the Wild Chimpanzees," by Dr. Jane Goodall, and others. Astronomy was the featured subject in the lecture/film series, "Stars In Your Eyes." Two symposia were offered: "Primates and the Tropical Rainforests," and "Whales From the People Who Study Them."

The international travel program offered thirteen expeditions to areas as diverse as Brazil, China, and the Grand Canyon. Trips were led by Academy staff members and other experts in the field. Among them, Dr. Robert T. Orr led a trip to Scotland and Norway, Dr. Robert Drewes led another to the Seychelles and the East coast of Africa, and museum Trustee Lynn Dunne led a diving trip to the Sea of Cortez. Over 200 members enjoyed these travel opportunities.



Approachable wildlife, exotic cultures, and congenial group experiences characterize the excursions of the Academy's International Travel Program.

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(as of 30 June 1984)

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Frank Almeda, *Director of Research*
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George E. Lindsay, *Director Emeritus;*
Director of Pepperwood Natural Preserve
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Edward E. Miller, *Aquatic Biologist*
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Helen Wong, *Recruiter*

VOLUNTEERS

(1983–1984)

The 600 persons whose names appear here have given the Academy the valuable gift of their time and skills. We honor them for their dedication and generosity and extend our warmest thanks.

Edith Abbott, *Do*
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Robert Ahern, *Ex*
Veronica Ahrens, *En*
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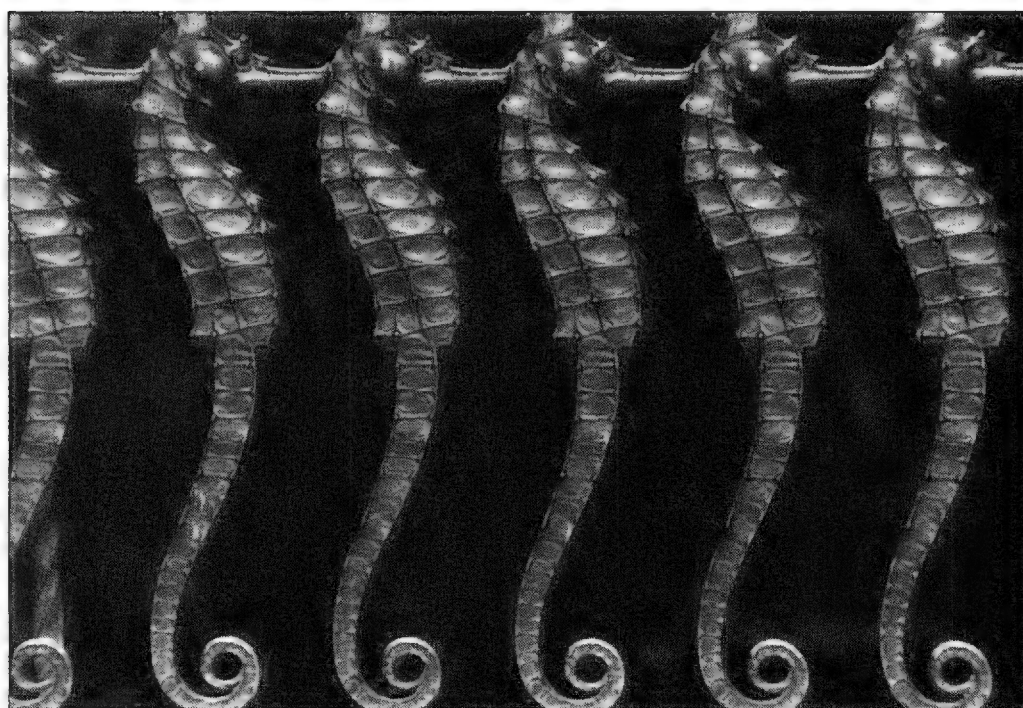
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The Fellows of the California Academy of Sciences are an important part of the institution—the governing body of eminent scientists and trustees whose predecessors founded the institution 130 years ago. These individuals represent the full range of disciplines within the natural sciences and are appointed in recognition of their contributions to the growth of scientific knowledge, particularly in the Pacific region. Nominated by their colleagues and appointed by the Board of Trustees at the recommendation of the Science Council, the fellows remain members of the fellowship for life.

FELLOWS' MEDALIST

Each year, one or more prominent fellows is selected for special honors. At the annual fellows' meeting in October 1984, the institution's highest honor, the Fellows' Medal, was presented to San Francisco science journalist David Perlman in recognition of his outstanding achievements in the field of science education and for his active participation in advancing the work of the Academy.



Above, 1984 Fellows' Medalist David Perlman in his office at the San Francisco Chronicle. [Photo by Nancy Rodger.]

Facing page, cast bronze seahorses are part of an ornate railing in the Steinbart Aquarium.

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CALIFORNIA ACADEMY OF SCIENCES FINANCIAL STATEMENT

STATEMENTS OF CURRENT FUNDS — General Operating Revenues, Expenses, Transfers and Fund Balance

Years ended 30 June 1984 and 1983

	1984	1983
Revenues:		
Admissions:		
General	\$1,619,759	1,457,893
Planetarium	181,487	169,164
Contributions:		
Corporate	71,253	50,580
Foundations	17,130	10,935
Individuals, trusts	211,193	187,653
Memberships	448,314	436,022
Concession Royalties:		
Restaurant	126,585	110,630
Museum store	78,074	95,665
Laser show (net)	24,990	34,314
Tuition and program fees:		
Junior Academy	11,301	8,658
Adult Education	106,383	27,663
International travel	50,000	50,000
City and County of San Francisco support of operations (note 8)	1,061,095	963,187
Institute of Museum Services Grant	50,000	50,000
Indirect cost reimbursement from grant contracts	120,516	101,417
Pacific Discovery and publications sales	14,630	12,932
Miscellaneous income	50,039	46,979
Total operating income	<u>4,242,749</u>	<u>3,813,692</u>
Investment income:		
Commercial Building rent (net)	610,447	523,216
General Endowment Fund interest, dividends	328,635	309,033
Total investment income	<u>939,082</u>	<u>832,249</u>
Total revenues	<u>5,181,831</u>	<u>4,645,941</u>
Investment income transfers from Special Purpose Fund	795,500	703,834
Total revenues and transfers	<u>5,977,331</u>	<u>5,349,775</u>
Expenses:		
Administration	244,288	212,812
Research division	1,157,818	1,123,180
Public programs	919,403	750,009
Aquarium	945,581	867,235
Development and membership	351,363	377,311
Support services and building operations	1,208,842	1,097,537
General and allocable costs	952,883	843,288
Capital expenditures	96,512	75,392
Employees' pension annuity (note 6)	97,954	88,795
Investment management fees	21,605	20,411
Total expenses	<u>5,996,249</u>	<u>5,455,970</u>
Excess of expenses over revenues and investment income transfers	(18,918)	(106,195)
Fund balance (deficit) at beginning of year	(183,213)	(77,018)
Fund balance (deficit) at end of year	<u>\$ (202,131)</u>	<u>(183,213)</u>

See accompanying notes to financial statements.

STATEMENTS OF CHANGES IN FUND BALANCES

Year ended 30 June 1984

	<i>Current funds</i>			<i>General</i>	<i>Museum</i>	
	<i>General Operating</i>	<i>Research</i>	<i>Special Purpose</i>	<i>Endowment</i>	<i>Modernization</i>	<i>Total</i>
	<i>Fund</i>	<i>Fund</i>	<i>Fund</i>	<i>Fund</i>	<i>Fund</i>	<i>All Funds</i>
Balances at beginning of year	\$(183,213)	555,926	13,958,747	4,166,676	—	18,498,136
Additions:						
Contributions:						
Corporate	71,253	100	21,120	—	—	92,473
Foundations	17,130	50,000	260,760	10,000	100,000	437,890
Individuals, trusts	211,193	28,156	184,421	212,693	21,788	658,251
Grant Income:						
Federal	—	398,927	—	—	—	398,927
State	—	10,000	—	—	—	10,000
Other	50,000	15,000	15,500	—	—	80,500
Other operating income	3,893,173	—	—	—	—	3,893,173
Investment income	939,082	5,617	1,173,129	—	252	2,118,080
Gain (loss) on sale of securities	—	—	(66,745)	71,856	—	5,111
Other	—	33,646	340,764	—	—	374,410
<i>Total additions</i>	5,181,831	541,446	1,928,949	294,549	122,040	8,068,815
Deductions:						
Salary expense	3,400,396	242,253	68,356	—	—	3,711,005
Other operating expenses	2,409,681	194,403	—	—	—	2,604,084
Expenditures of research grants	—	108,618	11,898	—	—	120,516
Amounts expended for furniture, fixtures and equipment (note 9)	96,512	162,544	138,977	—	—	398,033
Amounts expended for construction (note 9)	—	—	47,378	—	—	47,378
Amounts expended for professional services	68,055	16,740	219,168	—	4,166	308,129
Amounts expended for investment management	21,605	—	100,791	—	—	122,396
Other	—	—	383,500	—	—	383,500
<i>Total deductions</i>	5,996,249	724,558	970,068	—	4,166	7,695,041
Transfers between funds	795,500	—	(795,500)	—	—	—
Balances at end of year	\$(202,131)	372,814	14,122,128	4,461,225	117,874	18,871,910

See accompanying notes to financial statements.

ACCOUNTANTS' REPORT

*The Board of Trustees
California Academy of Sciences:*

We have examined the balance sheets of the funds of the California Academy of Sciences as of 30 June 1984 and the related statements of current funds—general operating revenues, expenses, transfers and fund balance for the years ended 30 June 1984 and 1983 and statements of changes in fund balances for the year ended 30 June 1984. Our examinations were made in accordance with generally accepted auditing standards and, accordingly, included such tests of the accounting records and such other auditing procedures as we considered necessary in the circumstances.

Under generally accepted accounting principles, expenditures for furniture, fixtures and equipment should be capitalized. The California Academy of Sciences charges such purchases to current expenses, the effect of which is more fully described in note 9.

In our opinion, except for the effect on the financial statements of the failure to capitalize expenditures for furniture, fixtures and

equipment as discussed in the preceding paragraph, the aforementioned financial statements present fairly the financial position of the California Academy of Sciences at 30 June 1984, the results of its current funds operations for the years ended 30 June 1984 and 1983, and the changes in its fund balances for the year ended 30 June 1984, in conformity with generally accepted accounting principles applied on a consistent basis.

Peat, Marwick, Mitchell & Co.

*San Francisco, California
11 September 1984*

BALANCE SHEETS

30 June 1984

ASSETS	Current funds			General Endowment Fund	Museum Modernization Fund	Total All Funds
	General Operating Fund	Research Fund	Special Purpose Fund			
Cash:						
Commercial accounts	\$ 7,485	9,435	417,091	4,216	—	438,227
Savings accounts and money market funds	—	—	623,077	100	—	623,177
Receivables:						
Research grants (note 2)	—	485,588	—	—	—	485,588
Accrued interest and dividends receivable	56,890	—	327,947	—	—	384,837
Other	35,759	28,800	25,699	100,000	—	190,258
Prepaid expenses	82,259	480	1,179	—	—	83,918
Investments in marketable securities (note 3)	—	—	11,333,626	3,774,713	—	15,108,339
Real property (note 10)	—	—	1,545,960	608,084	—	2,154,044
Due from other funds	—	45,340	—	—	117,874	163,214
<i>Total assets</i>	<i>\$182,393</i>	<i>569,643</i>	<i>14,274,579</i>	<i>4,487,113</i>	<i>117,874</i>	<i>19,631,602</i>
LIABILITIES AND FUND BALANCES						
Liabilities:						
Accounts payable	233,674	37,864	90,214	—	—	361,752
Accrued expenses	7,713	—	—	—	—	7,713
Deferred grant income (note 11)	—	158,965	—	—	—	158,965
Other liabilities	65,732	—	2,316	—	—	68,048
Due to other funds	77,405	—	59,921	25,888	—	163,214
	384,524	196,829	152,451	25,888	—	759,692
Fund balances (deficit):						
Current unrestricted, available for general operations	(202,131)	—	—	—	—	(202,131)
Current restricted, designated by donors for:						
Research grants	—	372,814	—	—	—	372,814
Special purpose	—	—	14,122,128	—	—	14,122,128
Museum modernization	—	—	—	—	117,874	117,874
Endowment fund, under board discretion	—	—	—	4,461,225	—	4,461,225
Fund balances (deficit)	(202,131)	372,814	14,122,128	4,461,225	117,874	18,871,910
Commitments and contingencies (note 12)						
<i>Total liabilities and fund balances</i>	<i>\$182,393</i>	<i>569,643</i>	<i>14,274,579</i>	<i>4,487,113</i>	<i>117,874</i>	<i>19,631,602</i>

See accompanying notes to financial statements.

NOTES TO FINANCIAL STATEMENTS

30 June 1984

1. Summary of Significant Accounting Policies

The California Academy of Sciences Natural History Museum and Aquarium (CAS) uses the accrual method of accounting with revenue recorded when earned and expenses recorded when incurred. Government grants are recognized in full when awarded if the term of the grant is one year or less. Grants applying to several years are deferred with the revenue recognized as related expenditures are incurred.

Gifts of specimens and collections are not included in the financial statements.

Donated materials and services are not recorded.

Certain reclassifications have been made to the 30 June 1983 financial information to conform to the 30 June 1984 presentation.

CAS has the following funds:

a. Current General Operating Fund:

This fund accounts for resources used in carrying on the routine operations of CAS in accordance with the limitations of its charter and bylaws. The Board of Trustees exercises discretionary control over this fund.

b. Restricted Funds:

1. The current Research Fund accounts for gifts and grants restricted to research projects. Certain of the current general operating fund expenditures are also for research.

2. The Special Purpose Fund accounts for resources contributed to CAS for specific purposes other than research projects. The resources are currently available for use, but expendable only for the purposes specified by the donors. Included are two major restricted funds, the William H. Noble fund and the Sinon Clare Lillis fund. Other accounts in this fund are designated for curatorial chairs, departmental endowment funds, special exhibitions and other special purposes. Income earned on these funds is generally available for the use of various CAS departments as designated by the Board of Trustees for operations. Expenditure of principal is also allowable if not specifically restricted by the donors, and it may be spent with Board action.

c. General Endowment Fund:

The General Endowment Fund is comprised of unrestricted gifts and bequests. Unrestricted gifts in excess of \$10,000 and life memberships in the amount of \$500 are credited to this fund. The principal amount of the gifts and bequests is not maintained intact in perpetuity. Transfers from the General Endowment Fund and dispositions of its principal are made at the discretion of the Board of Trustees. The endowment investment income is credited, as earned, to the current general operating fund.

- d. Museum Modernization Fund:
The Museum Modernization Fund is for resources contributed specifically for construction projects, plant additions, and the general capital renovation of the museum.

2. Research Grants Receivable

Grants receivable represent amounts pledged to CAS for certain operations and for the completion of designated projects in future years. The grants are collected when expenditures are made for the designated project. A summary of grants receivable follows:

National Endowment for the Arts	\$ 16,932
National Science Foundation	435,980
Other	32,676
	<u>\$485,588</u>

3. Investments—Marketable Securities

Securities are recorded at the lower of aggregate cost or market in accordance with generally accepted accounting principles. If acquired by gift, a security's cost is equal to the fair market value at the date of acquisition. At 30 June 1984, the book value and net unrealized gains pertaining to the marketable securities portfolios were as follows:

	<i>Book value</i>	<i>Market value</i>	<i>Net unrealized gain (loss)</i>
Special Purpose Fund:			
<i>Bonds and cash equivalents</i>	\$ 9,305,033	9,185,737	(119,296)
<i>Stocks</i>	2,028,593	2,503,801	475,208
	<u>\$11,333,626</u>	<u>11,689,538</u>	<u>355,912</u>
General Endowment fund:			
<i>Bonds and cash equivalents</i>	1,578,331	1,450,786	(127,545)
<i>Stocks</i>	2,196,382	2,610,104	413,722
	<u>\$ 3,774,713</u>	<u>4,060,890</u>	<u>286,177</u>

4. Buildings

The buildings acquired by the CAS in Golden Gate Park are not reflected in the accompanying balance sheets since, under the terms of the Charter of the City and County of San Francisco, no one other than the City may hold title to buildings on City property. As the CAS facilities in Golden Gate Park are acquired, title is transferred to the City and County of San Francisco. The buildings were valued at \$22,800,000 by the latest insurance appraisal in 1982.

5. Collections, Library and Equipment

Collections, library and equipment are expensed in the year of acquisition and, as such, are not reflected in the accompanying balance sheets. CAS staff has estimated the replacement cost of collections, library, and equipment to be well in excess of \$20,000,000.

6. Employees' Pension Annuity

On 1 January 1964, CAS adopted a pension plan utilizing individual annuity contracts for all regular full-time staff members under the age of 59 as of that date. On 1 January 1976, this plan was amended to comply with the Employee Retirement Income and Security Act of 1974.

Under the provisions of the plan, CAS and its eligible employees each contribute an amount equal to five percent of the amount of salary subject to Social Security tax and seven and one half per cent of the amount of salary above the Social Security tax base. Total pension expense for 1984 was \$97,954 and \$88,795 for 1984 and 1983, respectively.

7. Trusts

CAS is the ultimate beneficiary under an irrevocable living trust in the amount of \$190,765 (market value \$235,578). The income of the trust is paid to the grantors and CAS bears the cost of all trust operations. The assets of the trust are not shown in the accompanying financial statements.

CAS is the trustee and beneficiary under four irrevocable unitrust agreements which, together, had a market value at 30 June 1984 of \$1,743,911. CAS is a fifty percent beneficiary under two of the agreements and is the sole beneficiary under the remaining two agreements. Each grantor receives an annual amount equal to a stated percentage of the net fair market value of the assets of the respective unitrust, except for one grantor who receives a stated percentage of the net fair market value of the assets or current income, whichever is less. The percentages range from five to eight percent. These

trusts absorb the costs of their operations. The assets of the trusts are not shown in the accompanying financial statements. Distributions to grantors under the unitrust agreements, for the fiscal year ended 30 June 1984, totaled \$110,177.

In 1983, CAS was named ultimate beneficiary of a Pooled Income Fund with a market value at 30 June 1984 of \$139,480. The assets of the fund are not shown in the accompanying financial statements.

8. Support from the City and County of San Francisco

Section 6.404d of the Charter of the City and County of San Francisco states that the City shall provide funds necessary for the maintenance of the Steinhart Aquarium and funds deemed proper for the maintenance of the Golden Gate Park buildings. During the fiscal years ended 30 June 1984 and 1983, CAS received \$1,061,095 and \$963,187, respectively, from the City and County of San Francisco for this support.

In addition to its annual support in the fiscal year ended 30 June 1983, the City and County of San Francisco (City) expended \$400,000 on behalf of CAS. The funds were used to remedy a problem of fresh water intruding into the normal sea water used in some of the Steinhart Aquarium's tanks. In the fiscal year ended 30 June 1984, the City expended \$108,500 on behalf of CAS to develop plans and specifications to reroof the Golden Gate Park complex and to seismically upgrade the 1910 North American Hall. The City has allocated \$1.3 million for the fiscal year to end 30 June 1985 from City surplus funds to complete the roofing project and the structural strengthening of the North American Hall. These expenses and related support are not included in the financial statements as they do not represent annual on-going support from the City and County of San Francisco.

9. Furniture, Fixtures and Equipment

CAS departs from generally accepted accounting principles in that it expenses furniture, fixtures and equipment as acquired rather than capitalizing them and amortizing the costs over the useful lives thereof. During 1984 and 1983, CAS acquired furniture, fixtures and equipment costing \$398,033 and \$166,930, respectively. CAS also expended \$47,378 in 1984 and \$102,546 in 1983 for commercial building remodeling and other construction which was not capitalized.

10. Real Property

CAS owns an eleven-story, fully depreciated commercial building located in the City of San Francisco. The value as recorded on the balance sheet of the General Endowment Fund represents the cost of the land. The building was valued in excess of \$12,000,000 by an appraisal in December of 1982. In 1984, CAS signed two leases of 5 and 10 years with its major retail tenants.

In 1979 CAS received title to 3,117 acres of ranchland in Sonoma County known as Pepperwood Ranch. CAS, under terms of the grant deed of title, must preserve the property in its current natural state and can utilize the property for research and educational activities for a period of at least ten years. The value as recorded on the balance sheet of the Special Purpose Fund represents the assessed value of the property on the date of the gift of \$808,460.

In 1981, CAS received a bequest of a fifty-percent interest in a four-unit commercial building located in San Leandro, California. The other half interest is owned by the Society of California Pioneers. Fair market value of CAS's half of the property on the date of the gift was \$87,500 and is recorded in the Special Purpose Fund.

In 1982 CAS received a bequest recorded at \$664,157, which included a residence in San Francisco, California, valued at \$650,000, household furnishings and cash. The bequest was recorded in the Special Purpose Fund. The house is currently the Executive Director's residence.

11. Deferred Grant Income

During the year ended 30 June 1984, CAS received a grant of \$228,900 from the National Science Foundation to be expended over a three-and-one-half-year period for partial support of the Botany Department collections. Grant revenue of \$69,935 was recognized in the current year in the Research Fund from this grant with the balance of \$158,965 deferred to future periods to be recognized as grant expenditures are incurred.

12. Commitments and Contingencies

CAS is involved in various claims and legal actions arising in the ordinary course of its operations. In the opinion of management, the ultimate disposition of all legal matters will not have a material adverse effect on CAS's financial condition.

13. Income Taxes

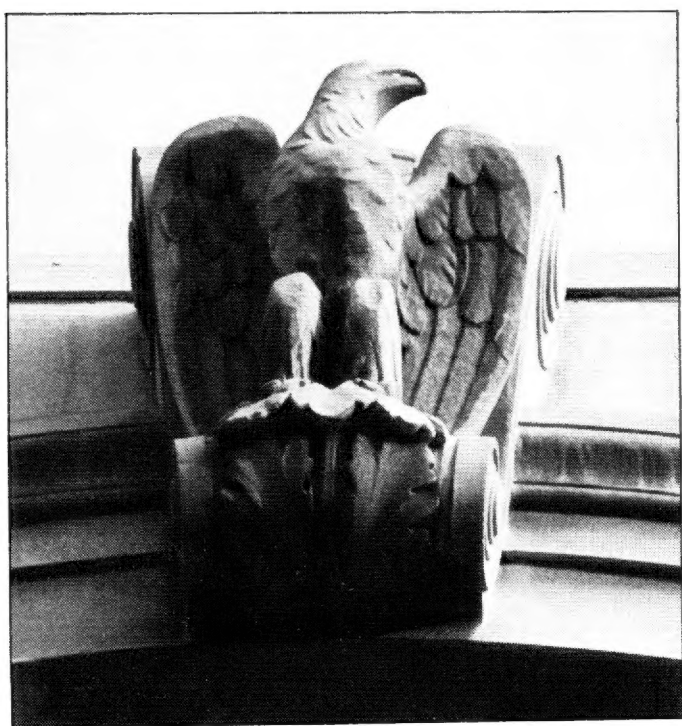
CAS is qualified as a tax-exempt organization under Section 501(c)(3) of the Internal Revenue Code and is not a private foundation. CAS is also a public-benefit tax-exempt corporation under the laws of the State of California.

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